ME-182

Otis

Elevators

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API INTERNATIONAL

CCA

OTIS ELEVATOR COMPANY

THE OTIS ELEVATOR INDUSTRY
COMPRISES LARGE MANUFAC-
TURING PLANTS THROUGHOUT
THE UNITED STATES, CANADA
EUROPE AND AUSTRALIA

(1905)

NEW YORK : : : : CHICAGO

PHILADELPHIA SAN FRANCISCO

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CCA

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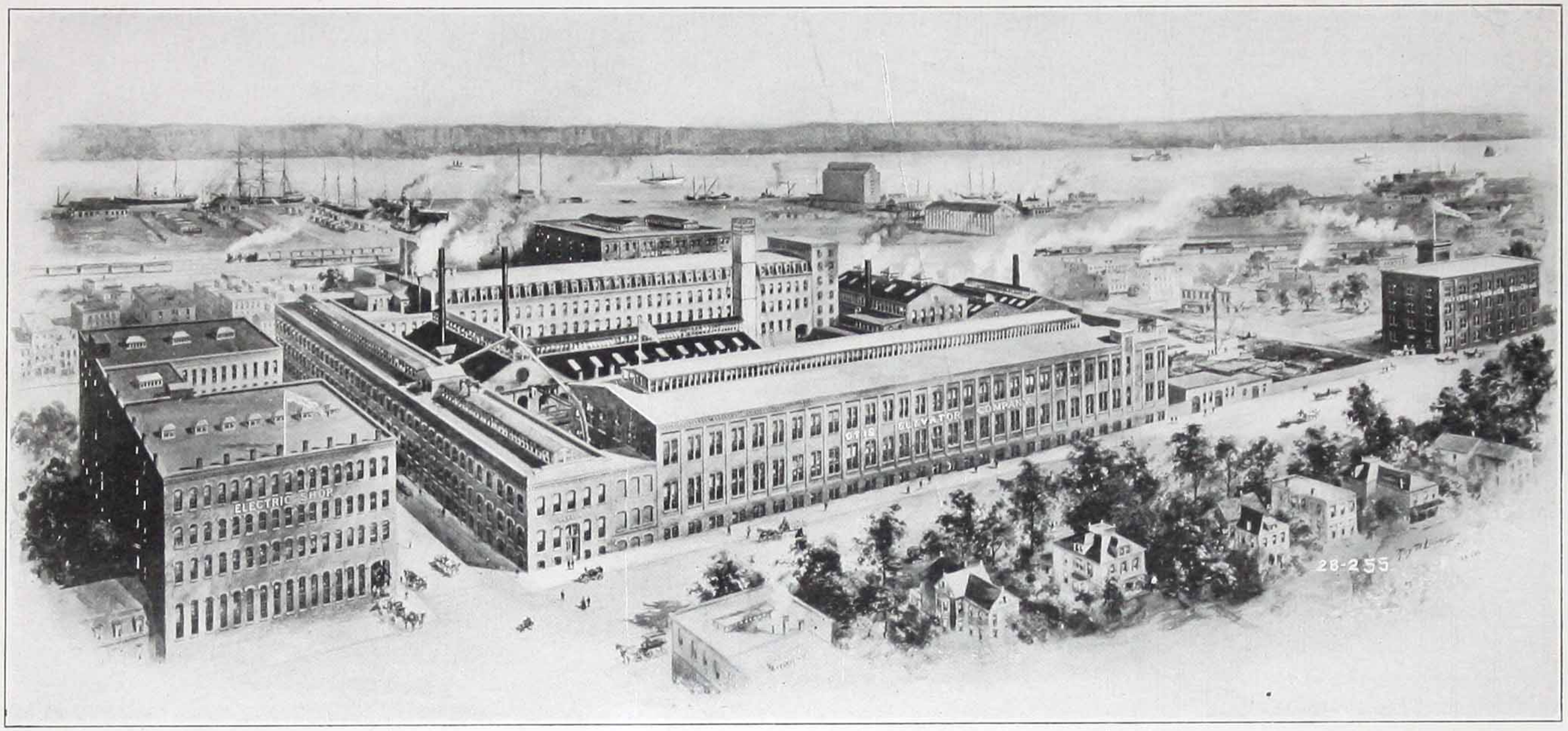

OTIS ELEVATOR COMPANY WORKS AT YONKERS, N. Y.

OTIS ELEVATOR COMPANY

NEW YORK 17 Battery Place
PHILADELPHIA West End Trust Bldg
CHICAGO 9 Jackson Boulevard
SAN FRANCISCO 509-511 Howard St.

BRANCH OFFICES IN THE FOLLOWING CITIES:

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Seattle, Wash.
Spokane, Wash.
St. Louis, Mo.
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Tacoma, Wash.
Vancouver, B. C.

OTIS-FENSOM ELEVATOR COMPANY, *Limited*

Main Office: CONFEDERATION BLDG., TORONTO

Works: HAMILTON

OFFICES IN ALL THE PRINCIPAL CITIES IN CANADA

FOREIGN OFFICES

Otis Elevator Company, *Limited*, London, E. C., England
4 Queen Victoria Street
Europe, Asia, Africa and Australia

Cie Française des Ascenseurs Otis
13 Rue de Hambourg, Paris, France

Hans von Adelson
W. Leipziger Str., 124, Berlin, Germany

Standard Electric Elevator Co., *Limited*
Melbourne, Sydney, Australia

Guinle & Company, Rio de Janiero
Agents for Brazil

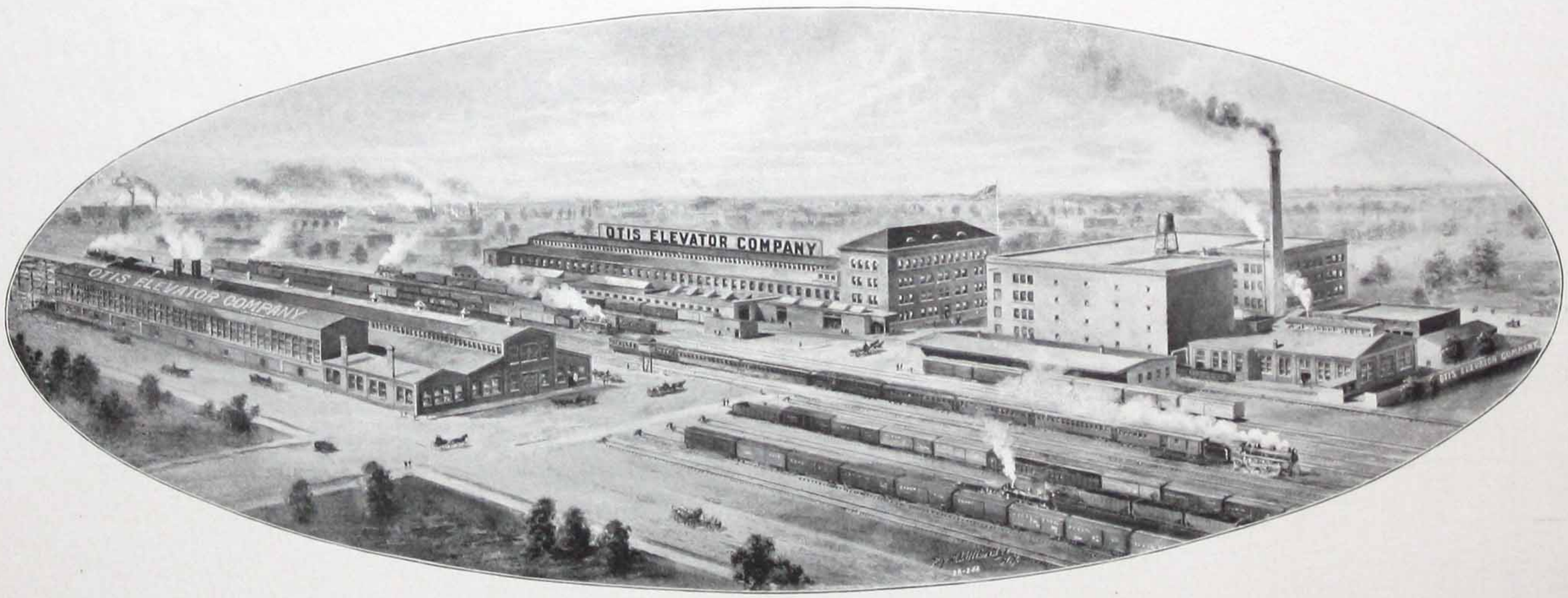
Buxton, Cassini & Company, Buenos Aires
Agents for Argentine Republic, Uruguay, Paraguay and Bolivia

Spencer & Waters, Santiago and Valparaiso
Agents for Chili

Electra, S. A., Mexico City
Agents for Mexico

Sussdorff, Zaldo & Co., Havana
Agents for Cuba

Other Foreign Countries Controlled from New York



OTIS ELEVATOR COMPANY WORKS AT CHICAGO, ILL.

INTRODUCTORY

THE great elevator industry of the Otis Elevator Company was founded in the year 1854, over half a century ago, by Mr. E. G. Otis. Starting in a small shop at Yonkers, N. Y., the business has since grown and expanded, and the original factory has developed into the great industrial establishment illustrated on page 5. With the development of the business, it has from time to time become necessary to build factories in other cities and in other countries, and, in some instances, to acquire existing establishments devoted to this branch of manufacturing. With each increase of facilities it has been possible to further improve the product. The present corporate name of "Otis Elevator Company" was adopted in 1898, and in this catalogue is presented an outline of the various types of elevators and hoisting machinery manufactured by us.

OTIS ELEVATOR COMPANY

October, 1905

WE call particular attention to the diagrams on pages 60, 61 and 62, showing the standard relations of hatchway, platform and car sizes. These relative dimensions apply to all elevators —electric, steam and belt driven, as well as hydraulic machines where the cylinders are located in a separate shaft.

ELECTRIC ELEVATORS

OUR long and varied experience in manufacturing elevators enabled us to produce the first successful Electric Elevator, and by applying to the improvement of our machines the highest grade of electrical and mechanical talent, we have kept our product in a superior class, absolutely unrivalled by that of any other manufacturer. Since we introduced the Electric Elevator its success has exceeded our most sanguine expectations. Our first Electric Elevator installation has been in continuous and satisfactory operation for over fifteen years, and we have since installed in this and foreign countries over 20,000 elevators of this type.

The vitally important questions of safety and control have been for years a subject of study by our experts, resulting in the perfection of a number of devices, simple in construction, positive, effective and practically automatic in operation.

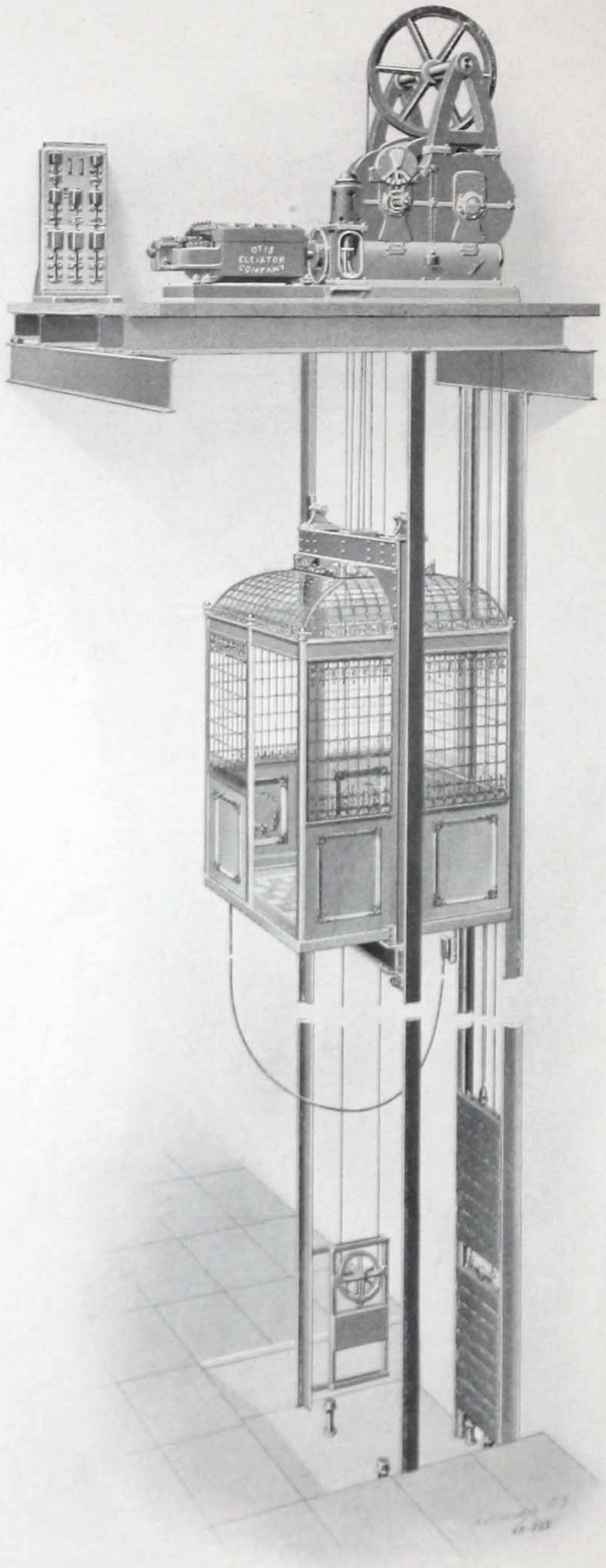


Fig. 1. Double Worm and Gear Electric Elevator, Overhead Installation

OTIS ELECTRIC ELEVATOR

WITH DOUBLE WORM AND GEAR

PASSENGER OR FREIGHT SERVICE **OVERHEAD INSTALLATION**

ELECTRICAL CONTROL

THE installation illustrated on opposite page is that of our Direct-connected Drum Type Electric Machine located over the hatchway, but more often the machine is placed in the basement, the structural conditions at the building, and the requirements of the business carried on, being the factors which determine the most suitable location.

The machine shown is our duplex worm type, described and illustrated more in detail on the following page, and is operated from the car by our improved electric switch and magnet controlling device, which gives the operator perfect control of the elevator, at the high car speeds which this type is capable of attaining.

This type of elevator is especially adapted for the service required in high-class office buildings, department stores, hotels, etc., and we have installed them in great numbers in buildings of this class.

OTIS ELECTRIC ELEVATOR ENGINE

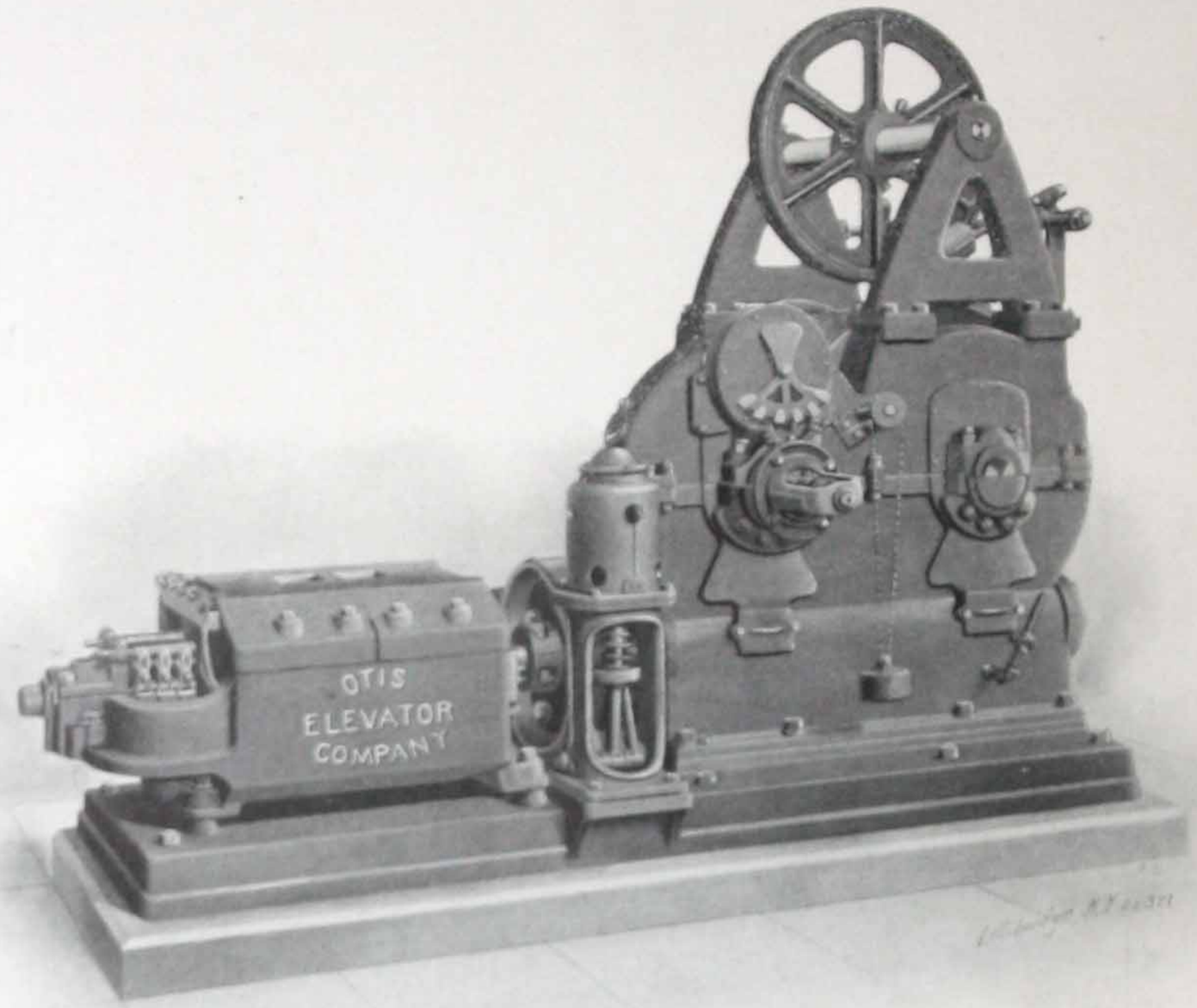


FIG. 2. THE OTIS ELECTRIC ELEVATOR ENGINE

THE Duplex Worm Gear Engine, shown above, has screws cut from a solid steel forging, the right and left-hand threads intermeshing with two intermeshing phosphor-bronze worm wheels, eliminating end thrust and adapting this machine to high car speeds and capacities beyond the limits of the single worm type. A powerful magnetic brake on the worm shaft holds the winding machine immovable whenever the car is stopped, or in the event of the operating current being interrupted or cut off from any cause. This is the type of machine which we installed to operate the cars having the highest travel of any electric elevators in any commercial building in the world, 326 feet.

COMBINATION PASSENGER AND FREIGHT ENGINE

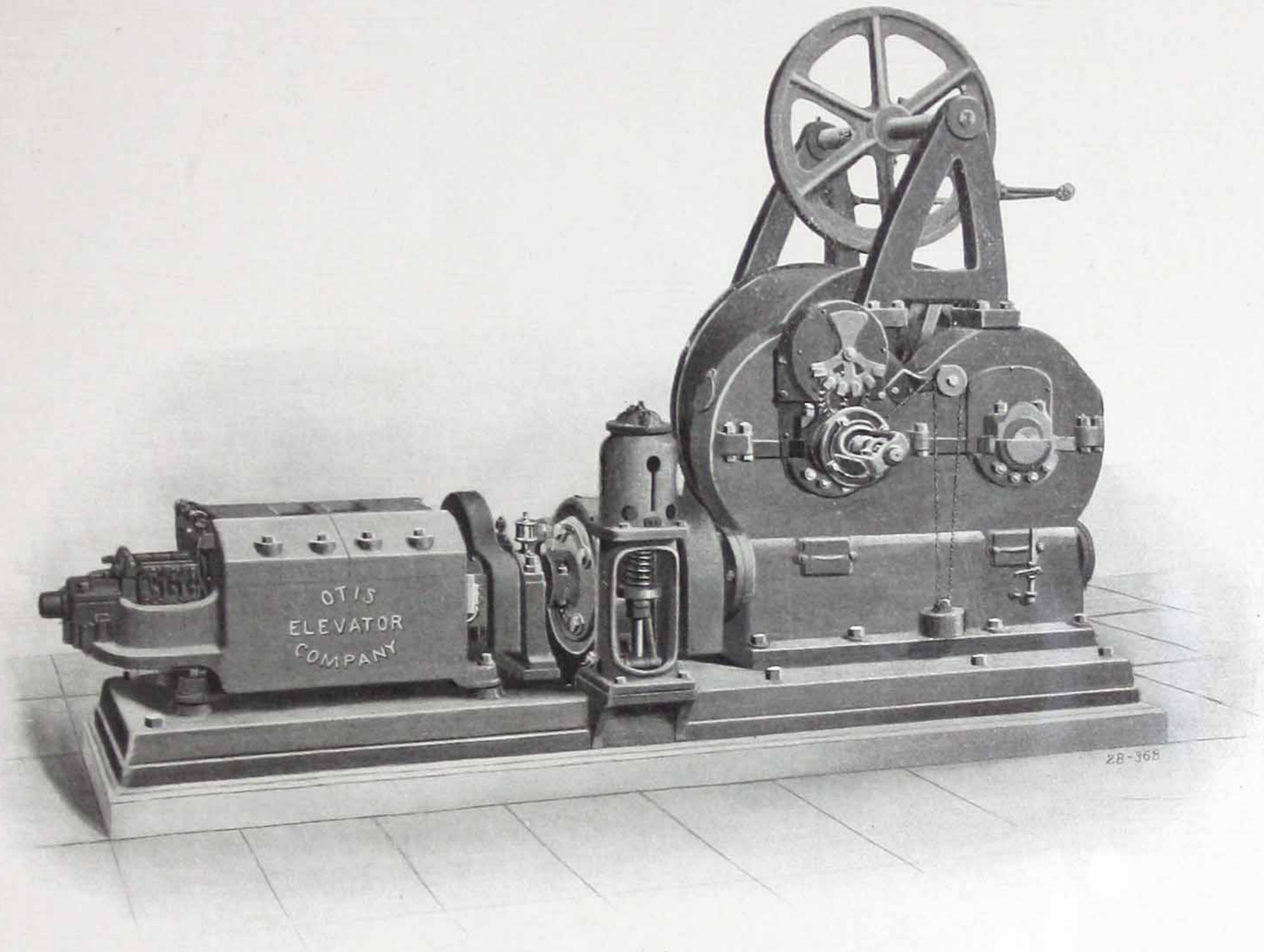


FIG. 3. COMBINATION PASSENGER AND FREIGHT ELECTRIC ELEVATOR ENGINE

THE Duplex Worm Gear Engine, shown above, is designed so the armature shaft is ordinarily directly coupled to the worm shaft and the car operated at the speed and to lift the load required to meet the conditions of regular passenger service. But it is so arranged that this direct coupling can be disconnected and a back gear thrown in, largely increasing the lifting capacity and reducing the car speed proportionately. This change can be readily and quickly made by any engineer or mechanic capable of taking care of the machine in ordinary service. A machine of this kind is a necessity in office and other buildings equipped with electric elevators where safes or other very heavy freight are occasionally handled.

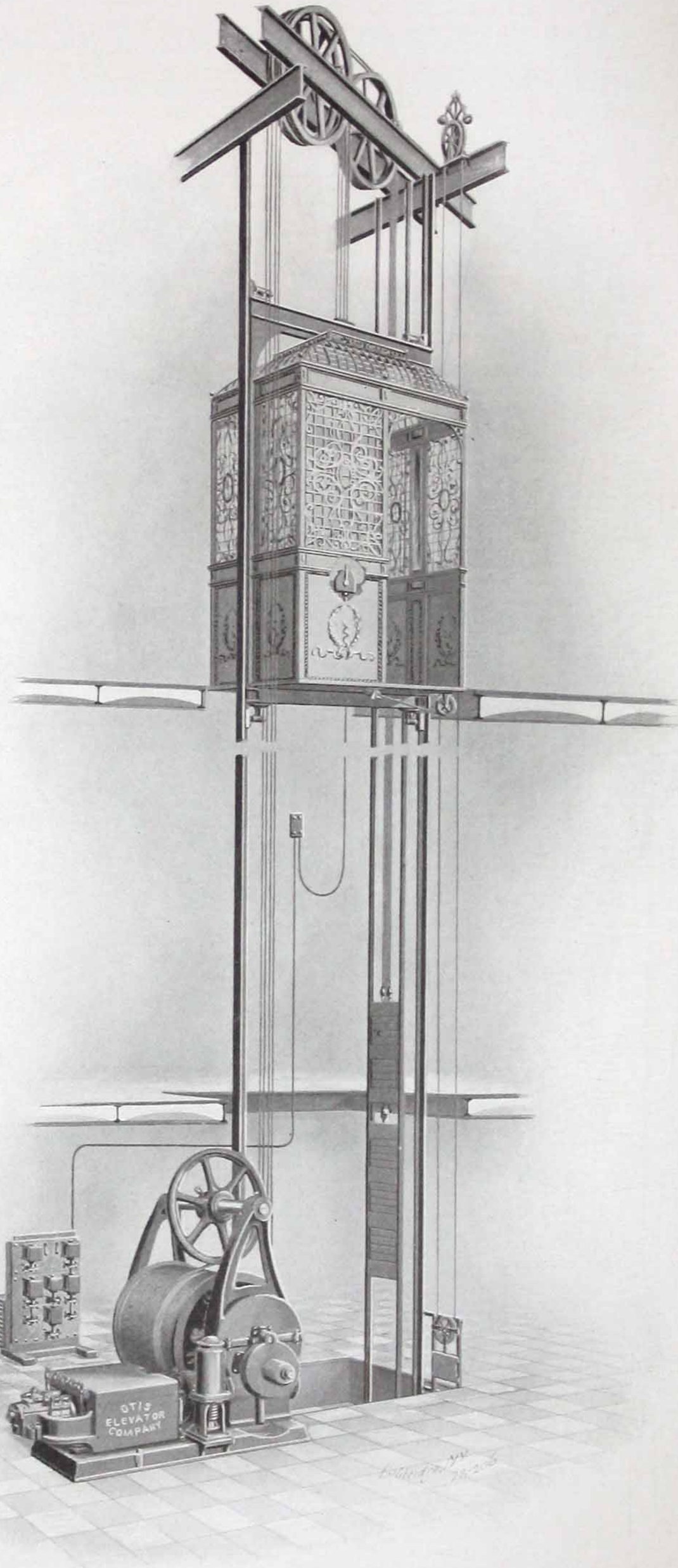


Fig. 4. Single Worm and Gear Electric Elevator, Basement Installation

OTIS ELECTRIC ELEVATOR

WITH SINGLE WORM AND GEAR

PASSENGER OR FREIGHT SERVICE. ELECTRICAL OR MECHANICAL CONTROL

BASEMENT INSTALLATION

THE installation illustrated on opposite page is that of our Drum Electric Elevator, with engine located in basement. The engine shown is of the single worm type and is unexcelled for the service required of an elevator in office buildings, stores, apartment houses, etc., of the smaller class, and within the limits of its capacity is fully equal to the more powerful duplex worm machine in smoothness of running, ease of control and other essential features.

The elevator may be controlled from the car by means of our electric switch and magnet device as shown, or by means of wheel, lever or other mechanical arrangement.

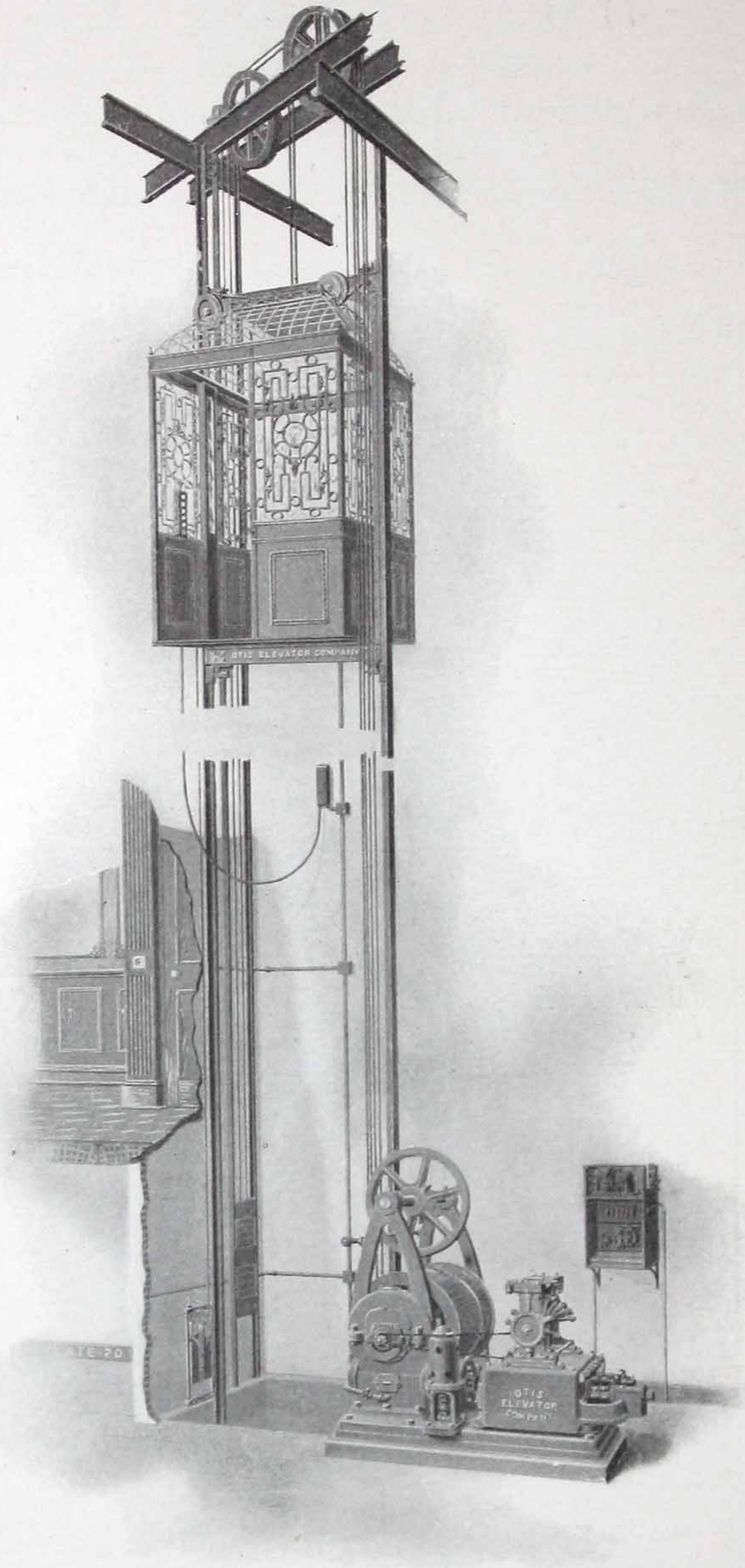


Fig. 5. Electric Elevator, with Push-button Control

OTIS ELECTRIC ELEVATOR

WITH PUSH-BUTTON CONTROL

THIS type is designed particularly for private residences. No attendant is required, the elevator is always ready for service, and it is equipped with every safeguard which human ingenuity can devise against the possibility of accident. A passenger desiring to use the elevator presses a button placed near the elevator shaft, and the car, if not in use, immediately travels to that floor and stops automatically. When the car has come to rest at that floor, the door can be opened. The passenger then enters the car and closes the door. The car will not leave that floor unless the door is tightly closed. Inside the car there is a series of push buttons, numbered to correspond with the various floors. The passenger pushes the proper button and the car proceeds to the desired landing and stops automatically. Not until the passenger has left the car and closed the door can the elevator be controlled from any other floor. Should the passenger desire, for any reason, to stop the car at any point of its travel, he can do so instantly by merely pushing the safety button with which the car is provided. The extreme simplicity of the push-button method of control and the absolute provision against accident render the operation of this elevator easy and safe for any member of the household. This type of elevator, although originally designed for private residences, has been installed with most satisfactory results in apartment houses, hospitals, and other places where the service is intermittent and it is desired to do away with the expense of an attendant.

OTIS ELECTRIC ELEVATOR

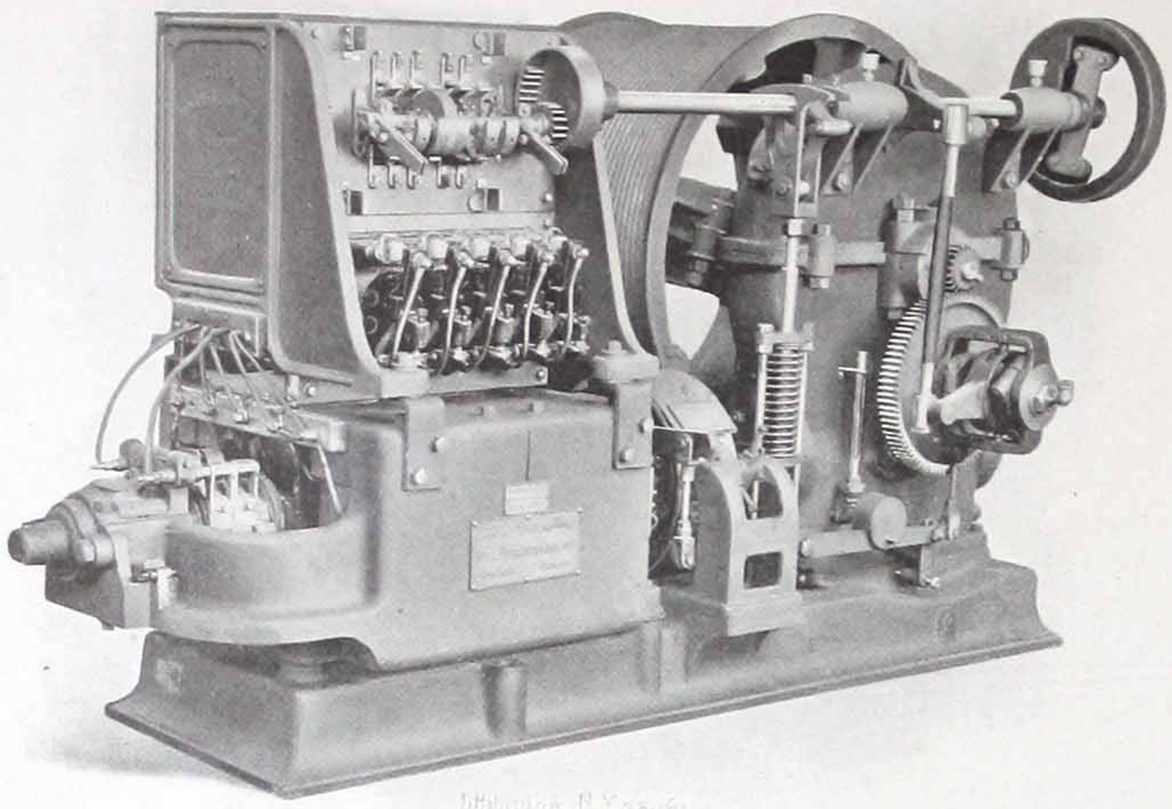


FIG. 6

THE Otis Electric Elevator Engine with single worm and gear, and with controller box mounted on motor. The machine shown is arranged for mechanical operating device in car, either wheel, lever or cable.

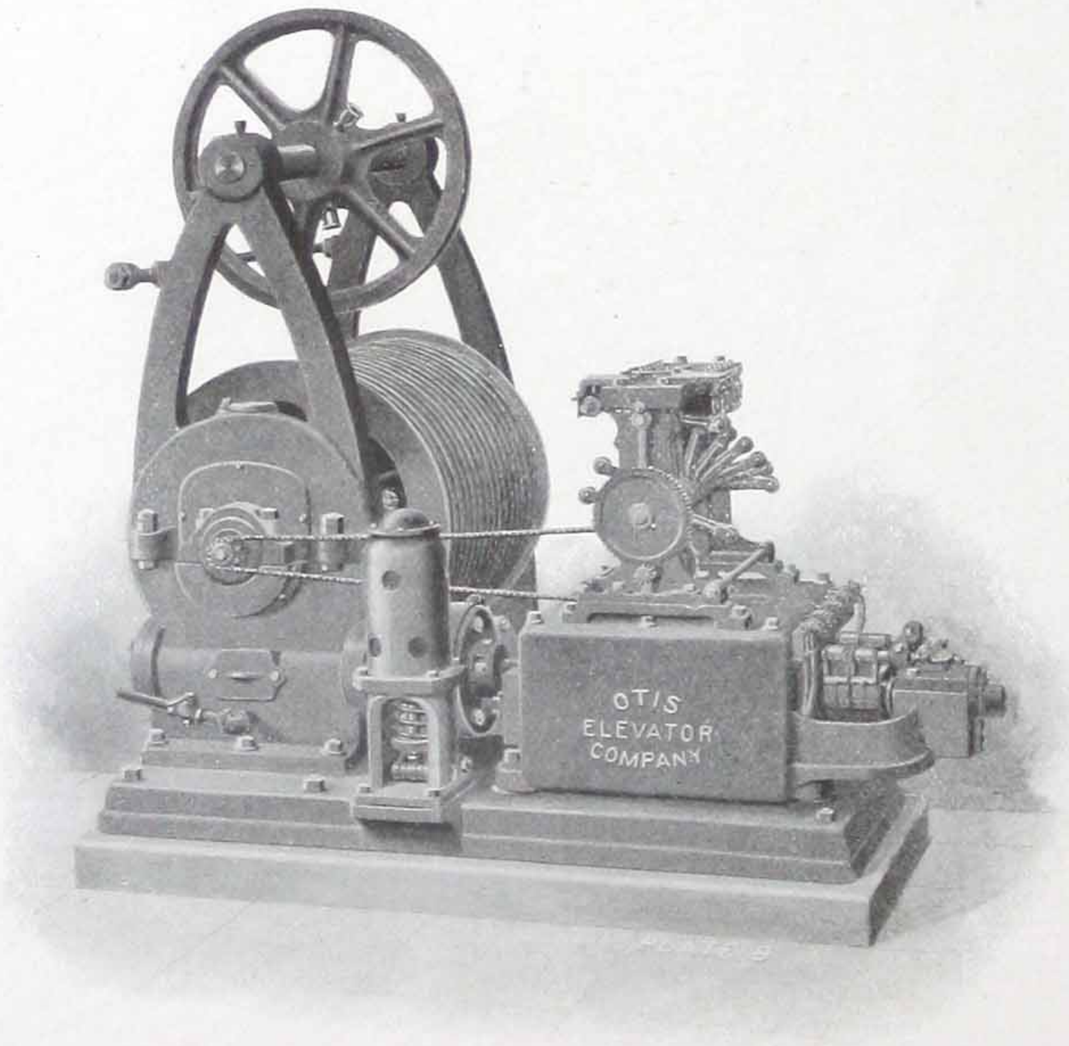


FIG. 7

THE Otis Electric Elevator Engine with automatic push-button controlling device mounted on motor, as illustrated and described on pages 18 and 19.

OTIS ELECTRIC ELEVATOR

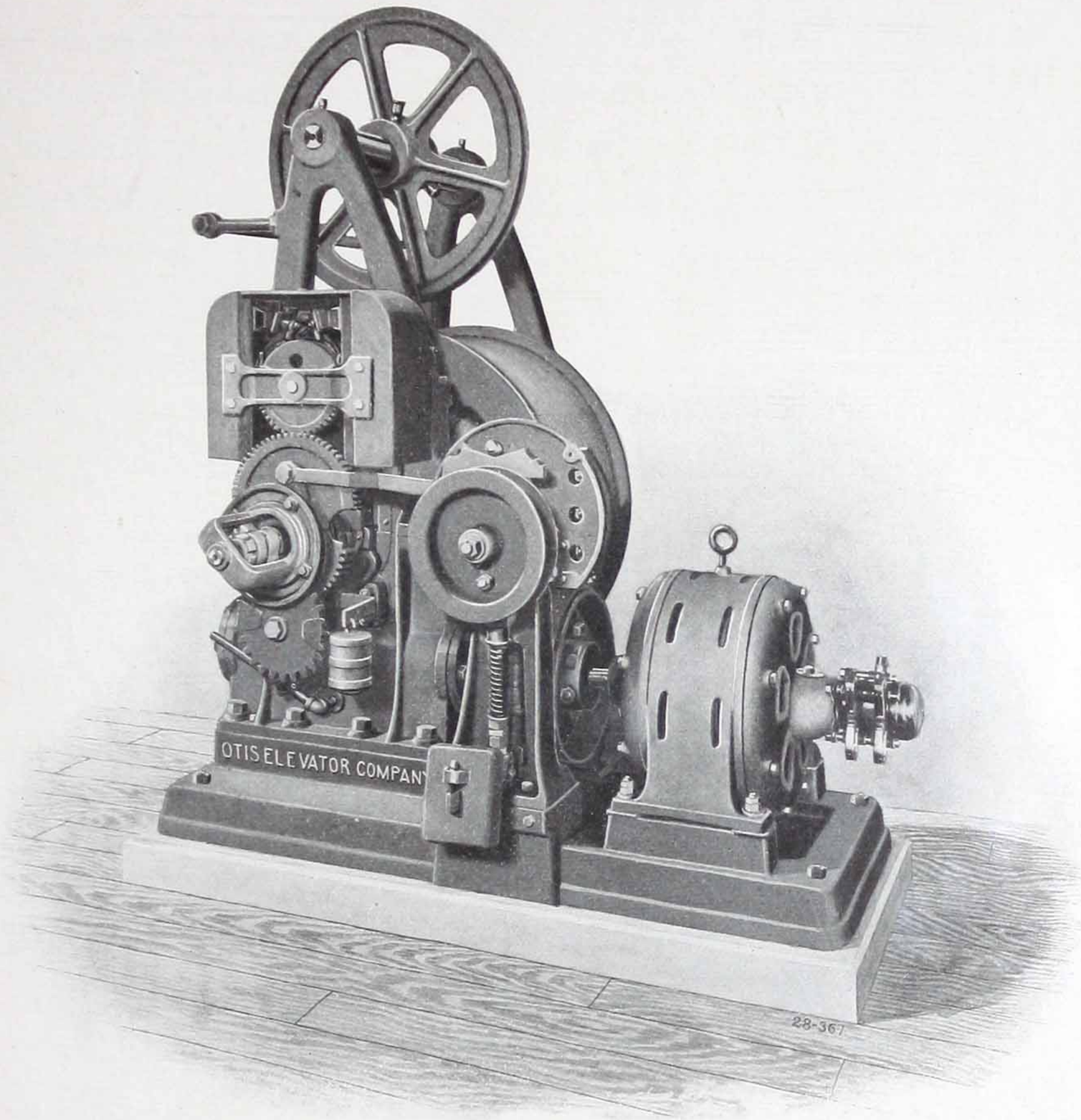


FIG. 8

THE Otis Single Worm Electric Elevator Engine, with alternating-current motor, built to operate on two and three-phase circuits of any commercial voltage. This machine has the ease of control and superior running qualities of our direct-current types and is designed with various operating devices.

The machine shown is arranged for mechanical controlling device in car, either wheel, lever or cable.

OTIS ELECTRIC ELEVATOR

THE Otis Internal-geared Electric Elevator Engine illustrated below is designed and built for heavy freight service, with comparatively low platform speed. All parts of the machine are built extra heavy to meet the great strains which will be imposed on them. The machine shown is provided with our semi-magnet control and arranged to be operated from the platform by means of a hand cable. This machine is particularly adapted for service in warehouses, automobile garages and other buildings where heavy loads are continually lifted.

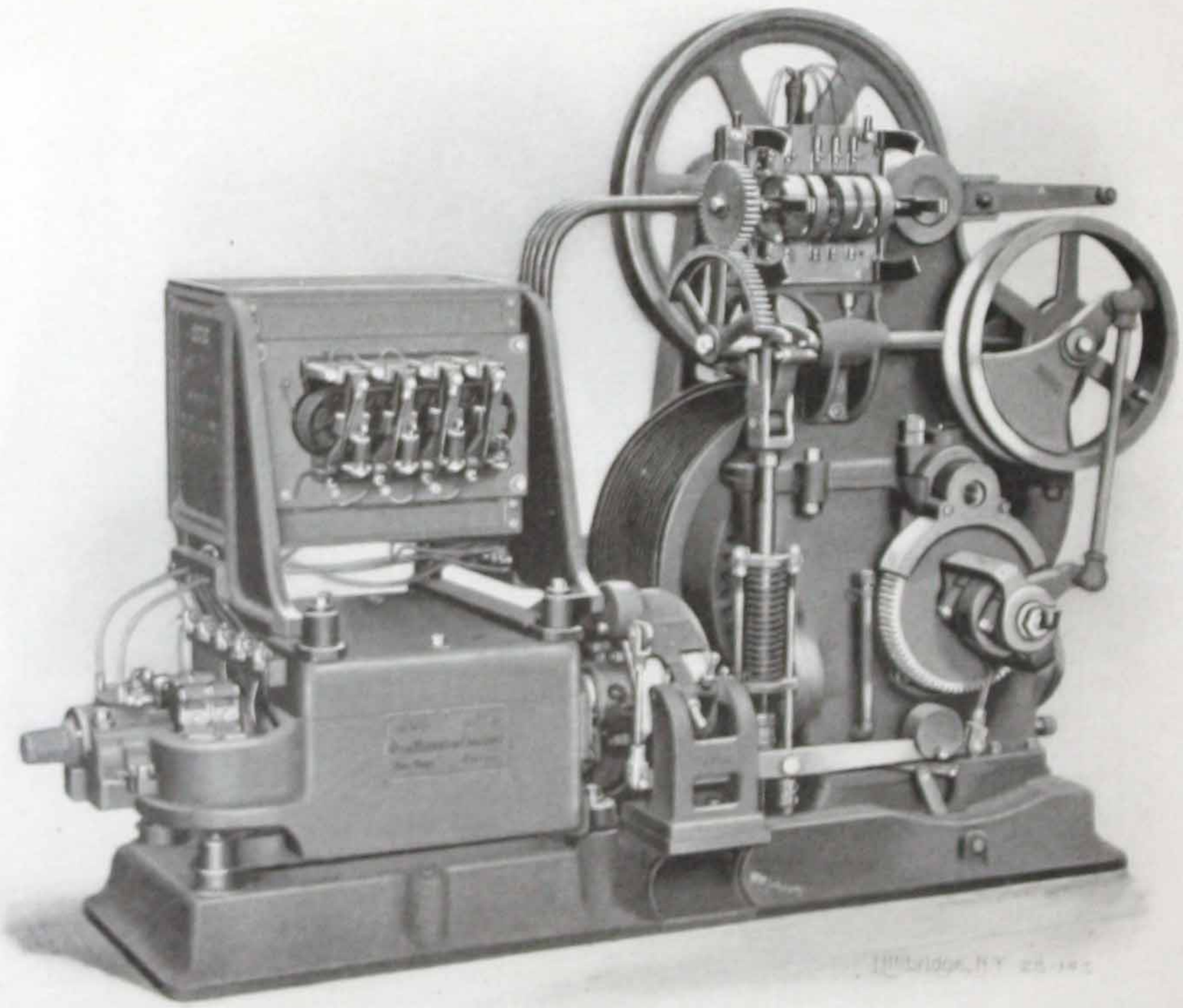


FIG. 9. INTERNAL-GEARED ELECTRIC FREIGHT ENGINE

OTIS ELECTRIC DUMB-WAITER

THE Otis Electric Engine and Control Board for dumb-waiter service, shown on this page, may be located above or below hatchway, or in almost any convenient position. It is ordinarily built with automatic push-button control, which can be arranged to meet the requirements of any situation. We illustrate in Figure 10 the mechanism of the Push-button Control Board. This type of dumb-waiter has become an essential part of the equipment of high-class hotels, restaurants, hospitals, libraries, etc., in which class of buildings we have installed great numbers. These machines may also be controlled mechanically.

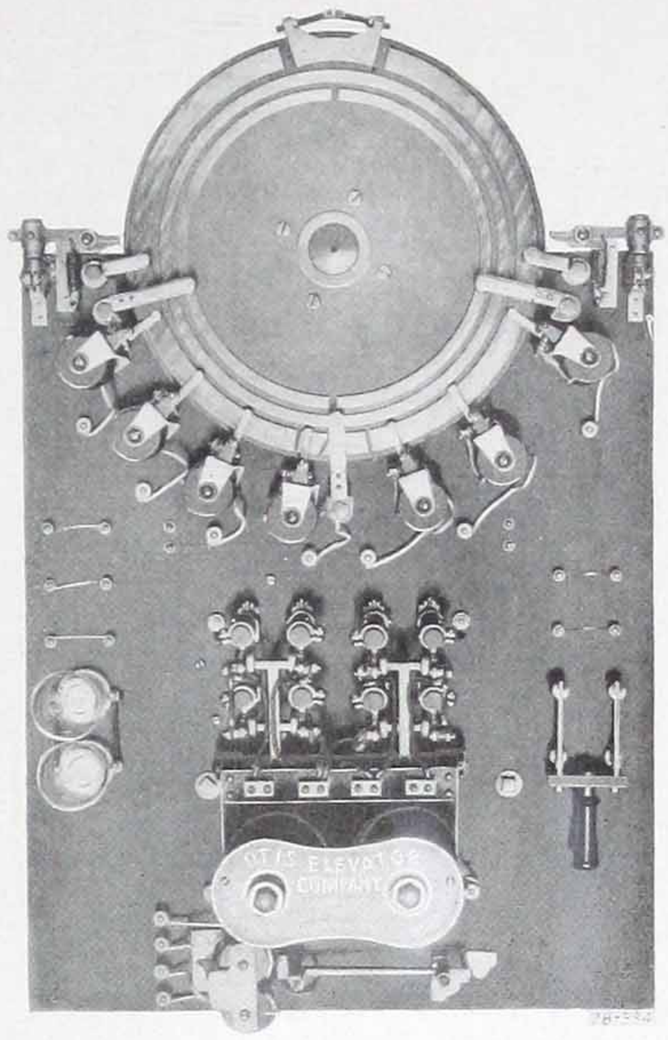


FIG. 10. CONTROL BOARD

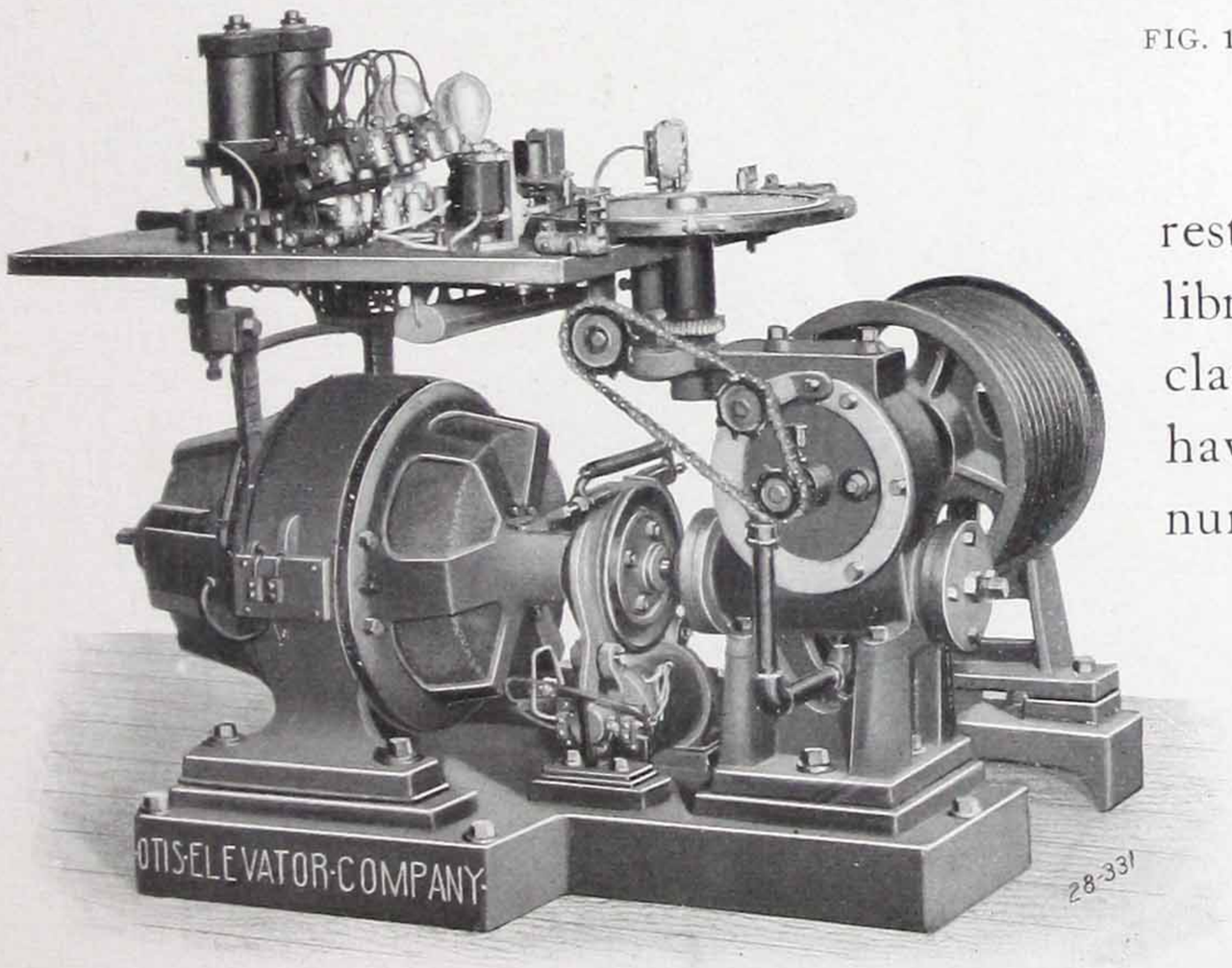


FIG. 11. ELECTRIC DUMB-WAITER ENGINE AND SWITCHBOARD

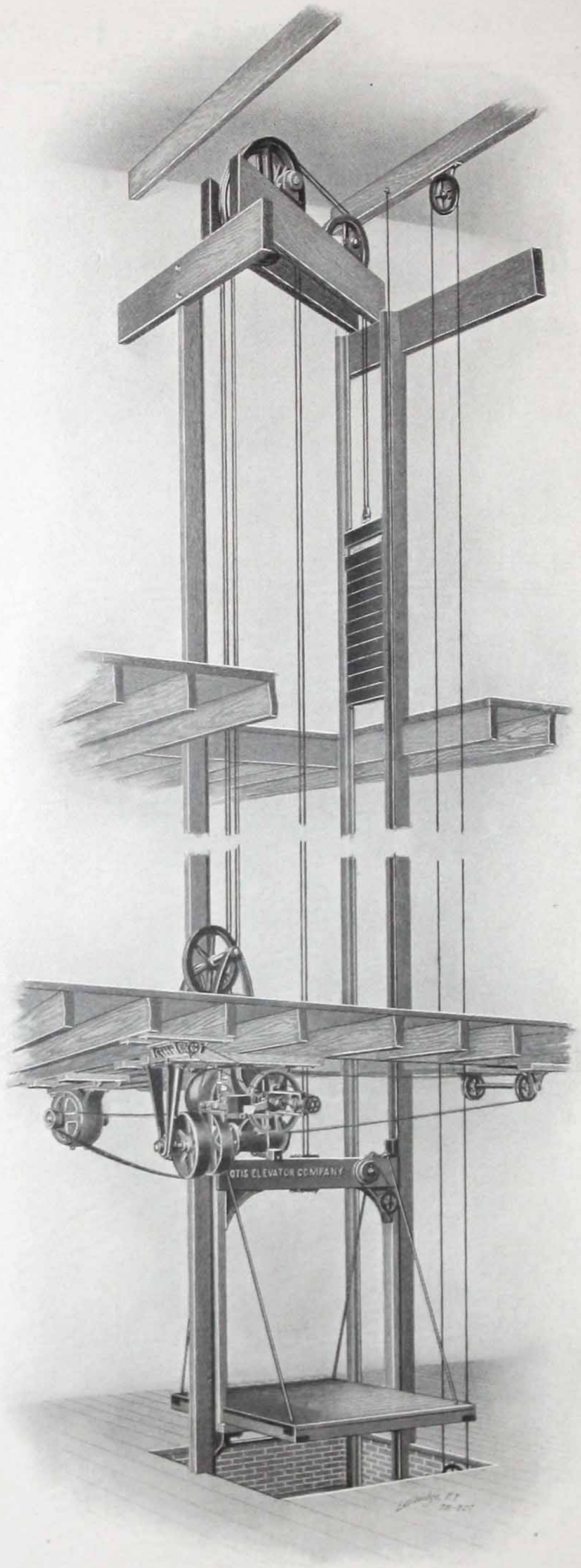


Fig. 12. Single-belt Electric Freight Elevator

SINGLE-BELT ELECTRIC FREIGHT ELEVATOR

THIS type of Electric Freight Elevator is much used where moderate lifting capacity at low speed is all that is required, and as it costs less than a direct-connected elevator of equal capacity it frequently commends itself to purchasers on that account.

The winding machine and the electric motor can be placed either on the ceiling or the floor, but we show both attached to the ceiling, as this is the method of installation commonly adopted.

The motor is of round pattern with compound winding and of the reversible type. Both motor and controller are specially designed for this style of elevator, and in practice are proving entirely satisfactory.

ELECTRIC WHIP HOIST

FIGURE 13 shows the Otis Electric Whip Hoist, which is designed for light and rapid hoisting for stores, warehouses, etc. The friction sheave is engaged with the lifting drum sheave by simply pulling the lever upward, and the machine can be operated and controlled from any distance. The moment the lever is released the brake is automatically applied, holding the load at the desired point. The hoist can be furnished with a special automatic control, which prevents the operator from running the hoist or raising the load beyond a terminal point of travel that may be fixed.

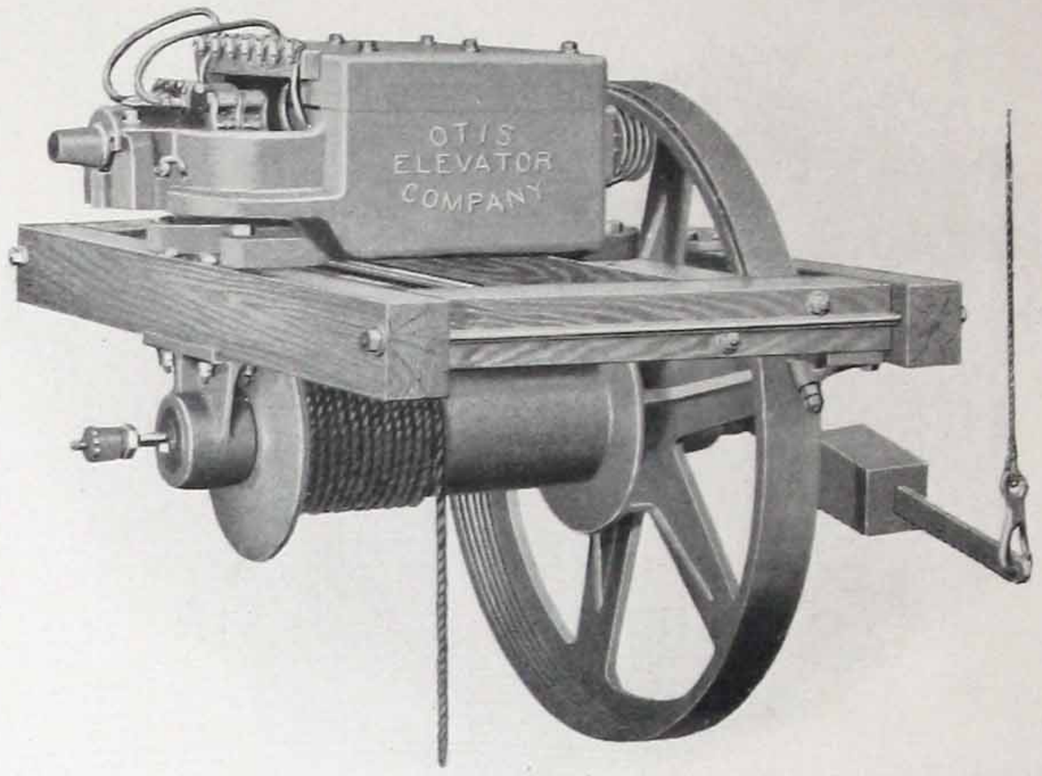


FIG. 13. ELECTRIC WHIP HOIST

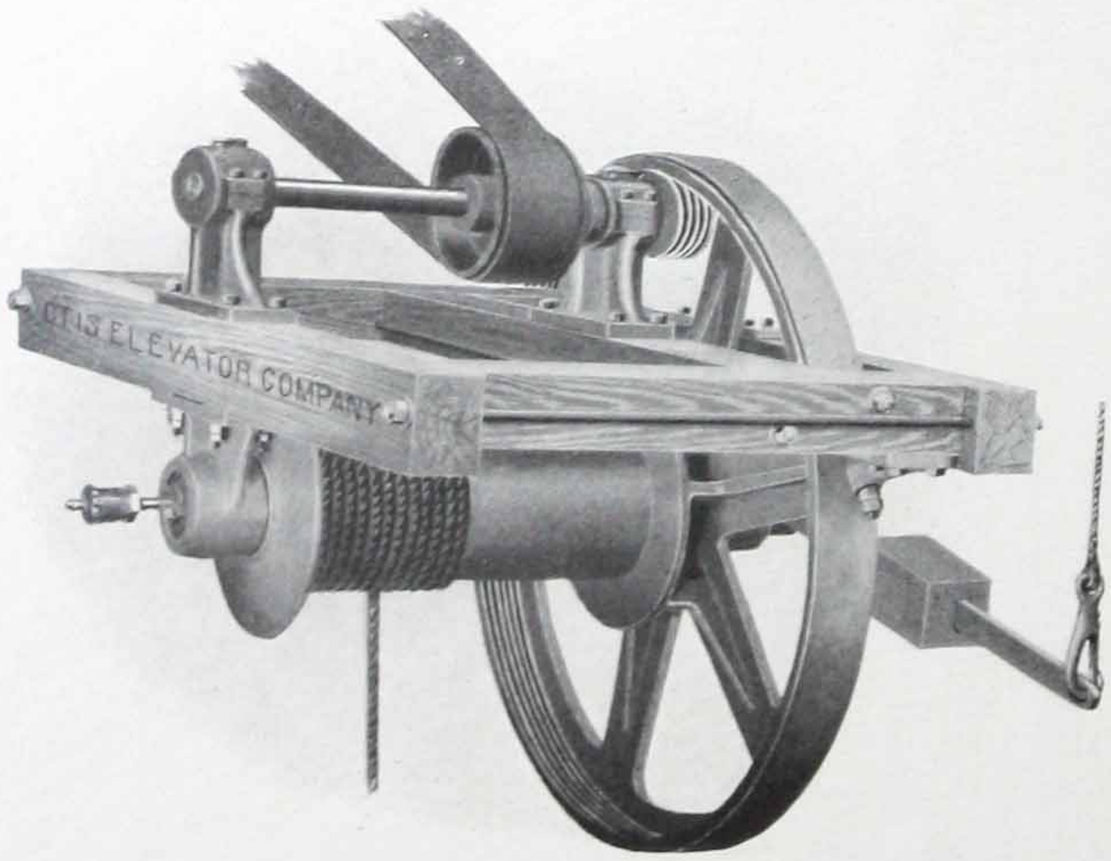


FIG. 14. OTIS BELT-POWER WHIP HOIST

FIGURE 14 shows the Whip Hoist arranged to be operated by belt power from line shafting instead of the electric motor. The lifting capacity, speed, and sizes are the same as in the electrically-operated hoist.

ELECTRIC SIDEWALK HOIST AND DOCK HOIST

FIGURE 15 shows the Otis Direct-connected Electric Sidewalk Hoist. The machine is extremely compact and very simple in construction and can readily be installed in any basement. This machine is quite inexpensive, both in first cost and in the cost of operation, and the many situations in which its installation will be highly desirable readily suggest themselves.

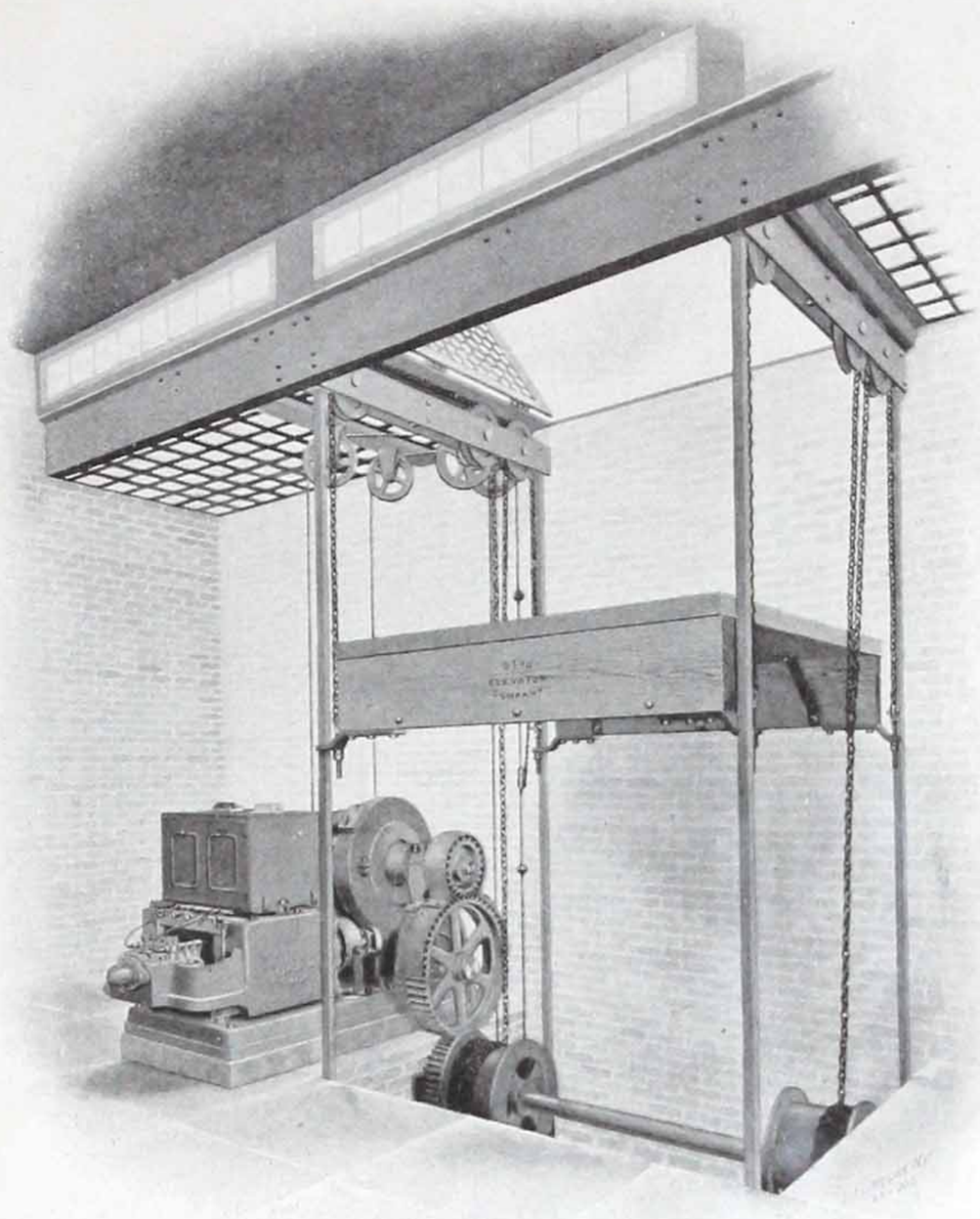


FIG. 15. ELECTRIC SIDEWALK HOIST

FIGURE 16 shows the Otis Electric Portable Hoisting Engine; but wheels can be removed and engine bolted to foundation. The "V" clutch and powerful band brake give perfect control of the engine in hoisting and lowering at variable speeds. The machine has been so constructed as to give the greatest economy in operation and maintenance.

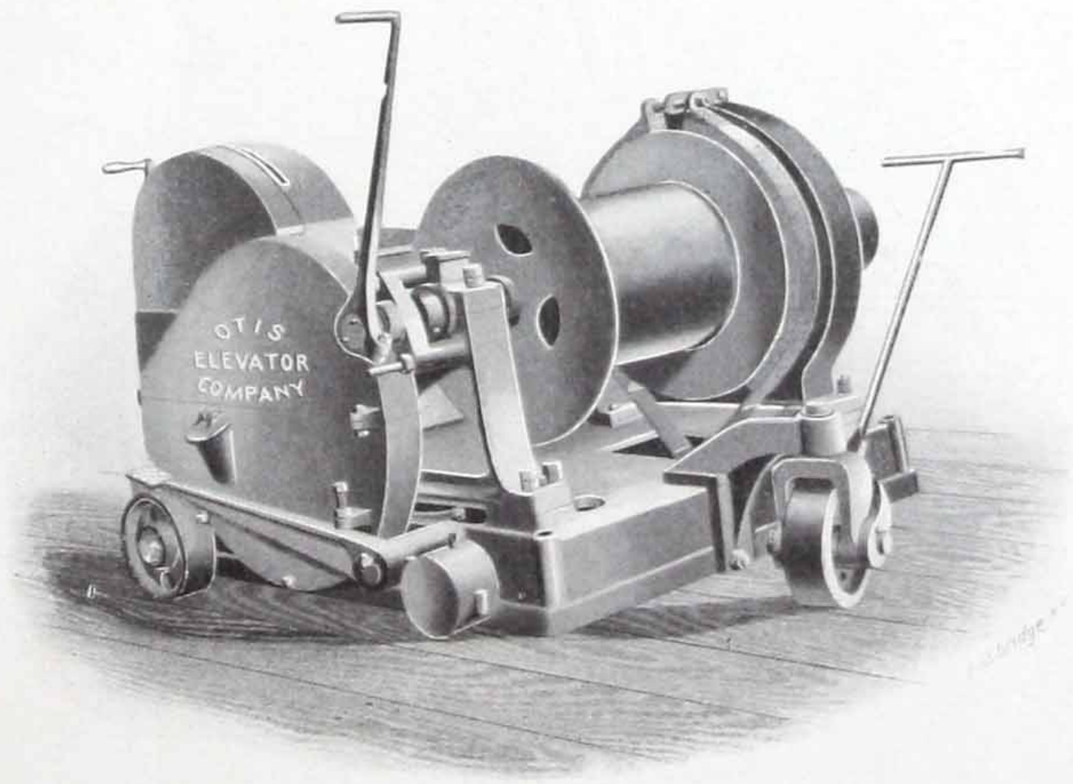


FIG. 16. ELECTRIC DOCK HOIST

OTIS MAGNET CONTROL

THE Otis Electric Magnet Controller, with Lever Car Switch, is the most improved type of electric elevator operating device, as with it the current is automatically and gradually admitted to the motor, enabling the operator to start and stop the car without shock or jar. This controlling device is constructed to secure the motor against damage by any overload or excess of current; these features are automatic in their operation, are independent of the operator in the car, and are designed to prevent more current being admitted to the motor than is required to do the maximum work of the elevator. We illustrate our standard car switch and one size of our magnet controller.

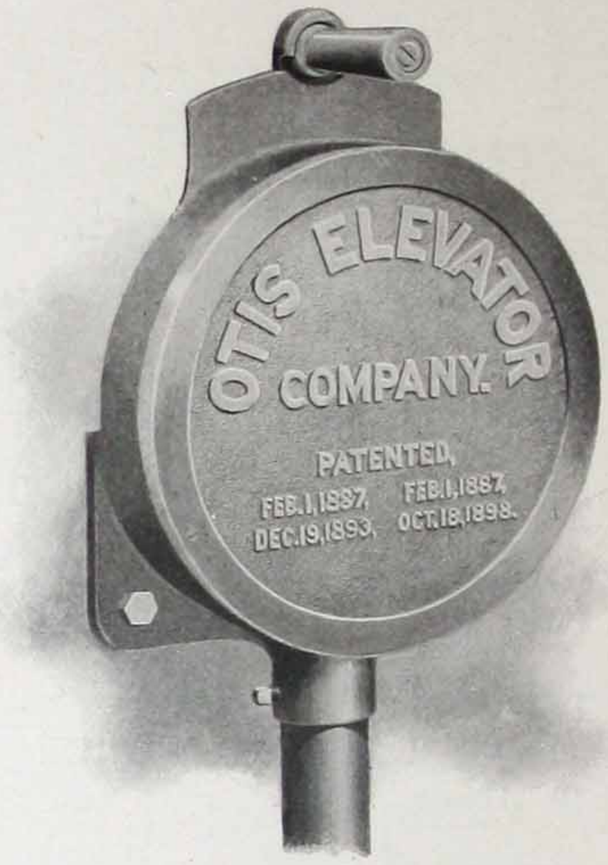


FIG. 17. THE OTIS LEVER CAR SWITCH

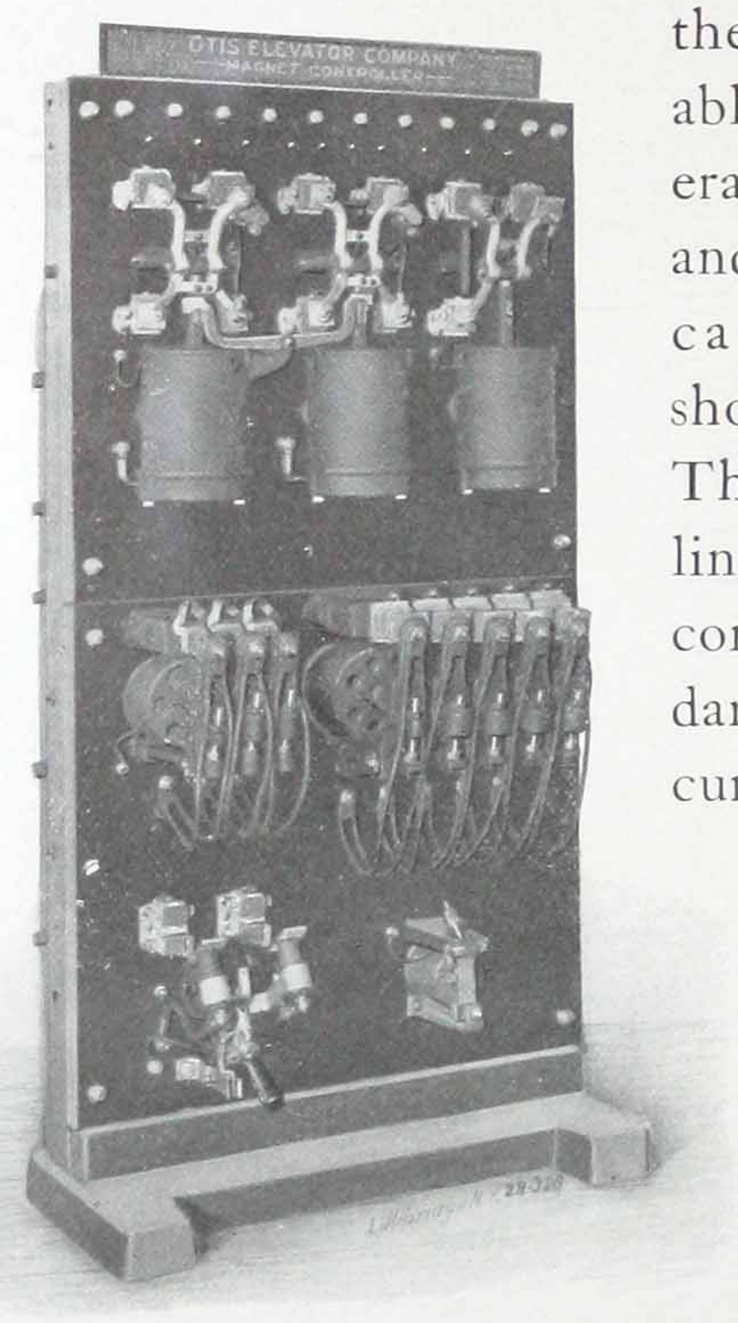


FIG. 18. MAGNET CONTROLLER

OTIS SEMI-MAGNET CONTROL

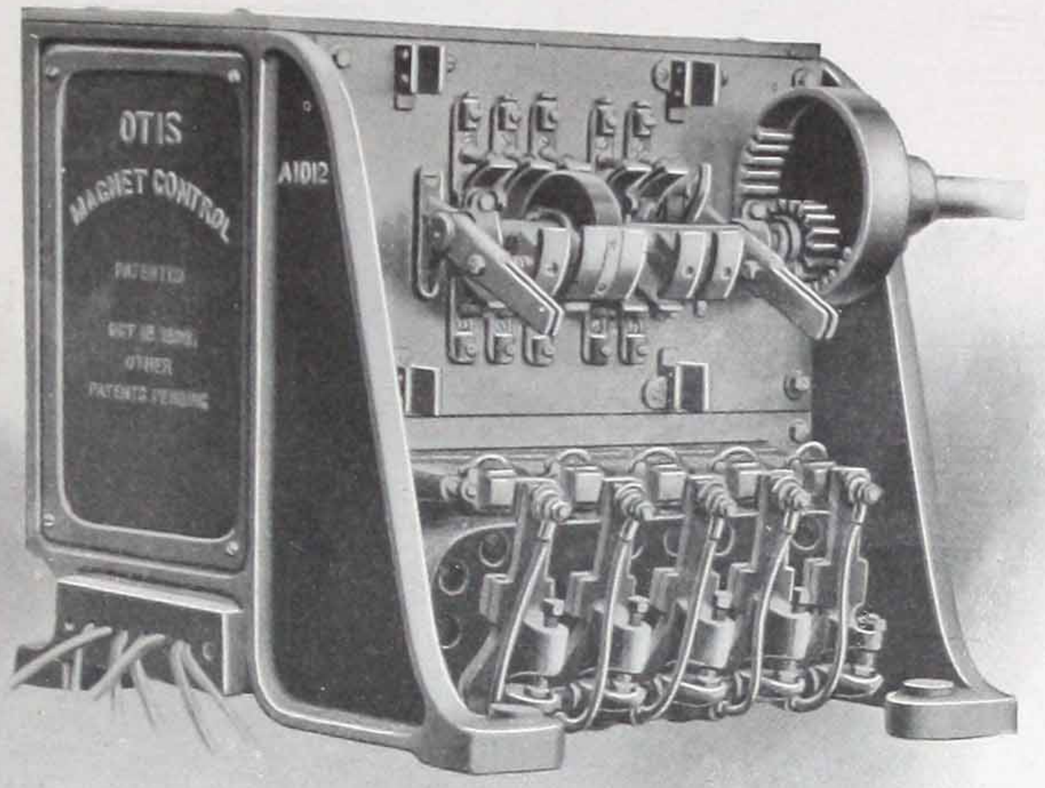


FIG. 19. SEMI-MAGNET CONTROLLER

THE semi-magnet control differs from the full-magnet system in that the line switch is opened and closed mechanically through the medium of a hand wheel, lever or hand rope in the car. Closing the switch admits starting current to the motor and thereafter the control operates automatically in a manner similar to that already described for the full-magnet system, the motor being fully protected against overload. We illustrate the reversing switch and accelerating magnets mounted together, and in Figures 6 and 9 show two methods of placing this control.

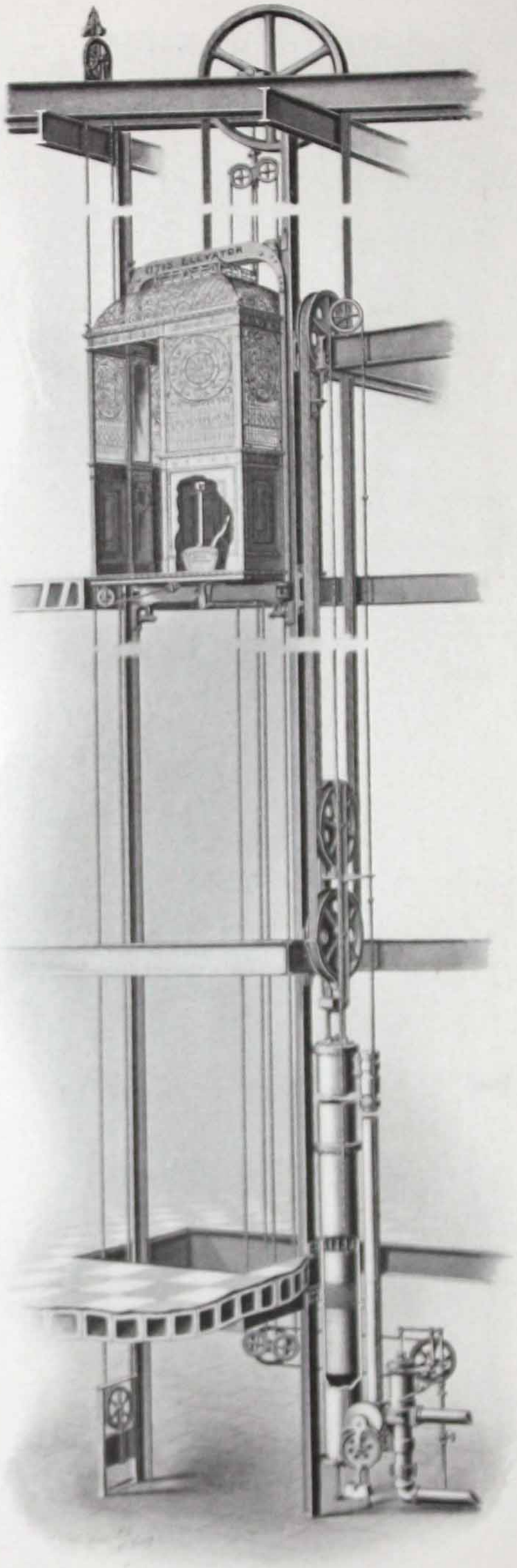


Fig. 20. Vertical Cylinder
Hydraulic Elevator

HYDRAULIC ELEVATOR

VERTICAL CYLINDER TYPE FOR PASSENGER OR FREIGHT SERVICE

THE illustration on opposite page shows the Otis Vertical Cylinder Hydraulic Elevator, the perfected modern development of the machine which gave the name "Otis" its world-wide reputation for safe and speedy elevator service, and made possible the modern "skyscraper."

This type of elevator is particularly suited for elevator service in tall office buildings where hard, continuous use at high car speeds is demanded. The hydraulic machine is equipped with a device which automatically regulates the speed at which the water flows into and out of the cylinder, effectually preventing the cars "running away," even when overloaded.

The installation shown is provided with our improved lever operating device for operating the main valve through the medium of a pilot valve, giving not only ease of control, but enabling the operator to run the car at any desired variation from its maximum speed.

The machine shown is geared 4 to 1, but we gear them 2 to 1, 3 to 1, 4 to 1, 6 to 1 or 8 to 1, to meet requirements, and it can be operated by water pressure from compression or gravity tank systems, or from street mains where sufficient pressure is available. It can be built for any car speed up to 800 feet per minute.

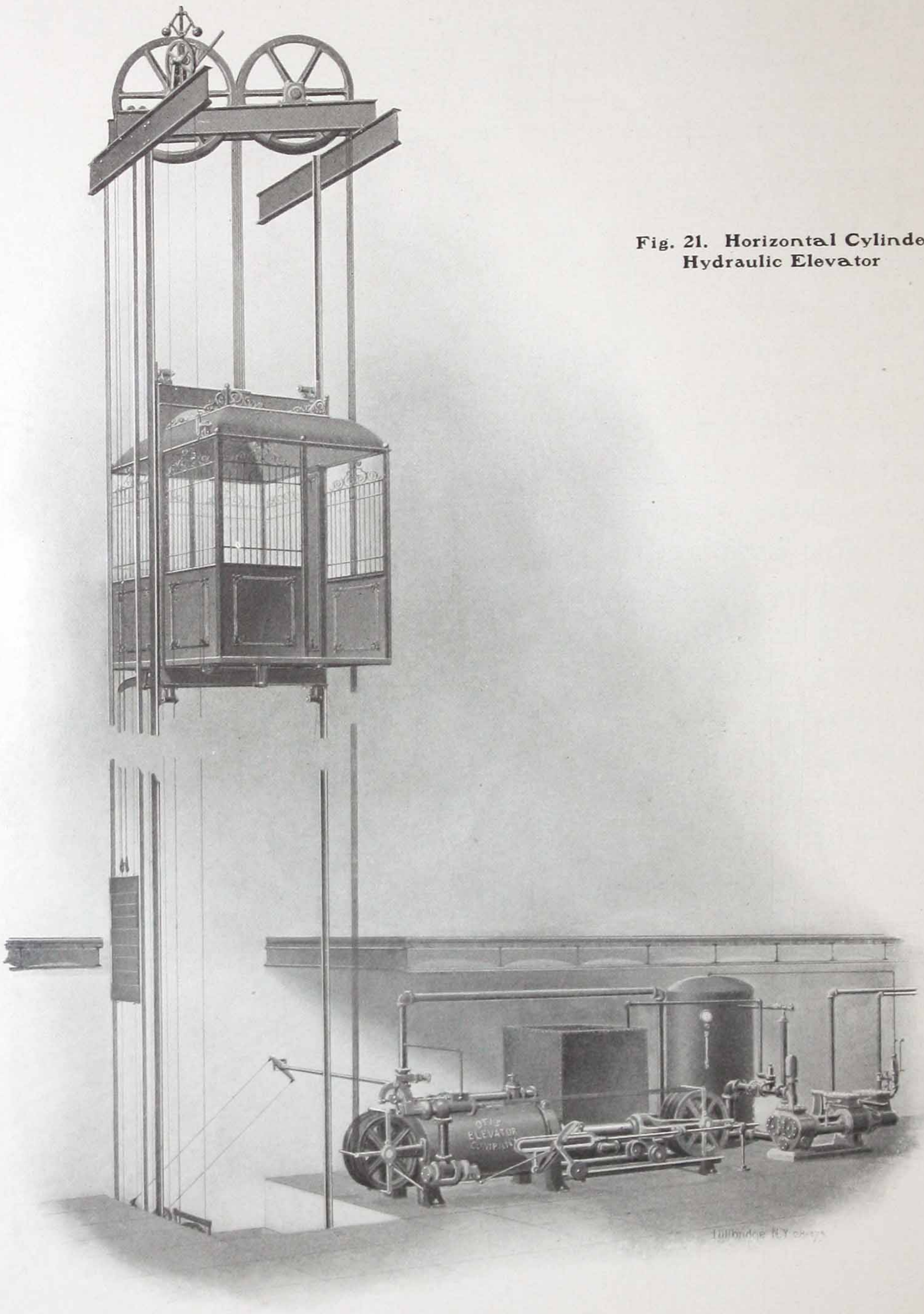


Fig. 21. Horizontal Cylinder Hydraulic Elevator

HYDRAULIC PASSENGER ELEVATOR

HORIZONTAL CYLINDER TYPE FOR PASSENGER OR FREIGHT SERVICE

FIGURE 21 shows the Otis Hydraulic Elevator with horizontal cylinder, designed for buildings where it is deemed advisable to install all of the elevator machinery in the basement.

In smoothness of operation, speed, safety, and other requisites of a high class elevator it is equal to the vertical cylinder type.

For buildings of a considerable height, we gear these elevators as high as 12 to 1. Where several are to be installed, the cylinders may be placed one above the other in a "double deck" or "triple deck" arrangement, thus further economizing floor space.

The illustration shows, in connection with the elevator, a compound duplex elevator pump, compression and discharge tanks and the necessary piping connections. The tanks are here shown in the basement, but, in large plants especially, it is often found more convenient to place the compression tank on roof or in attic.

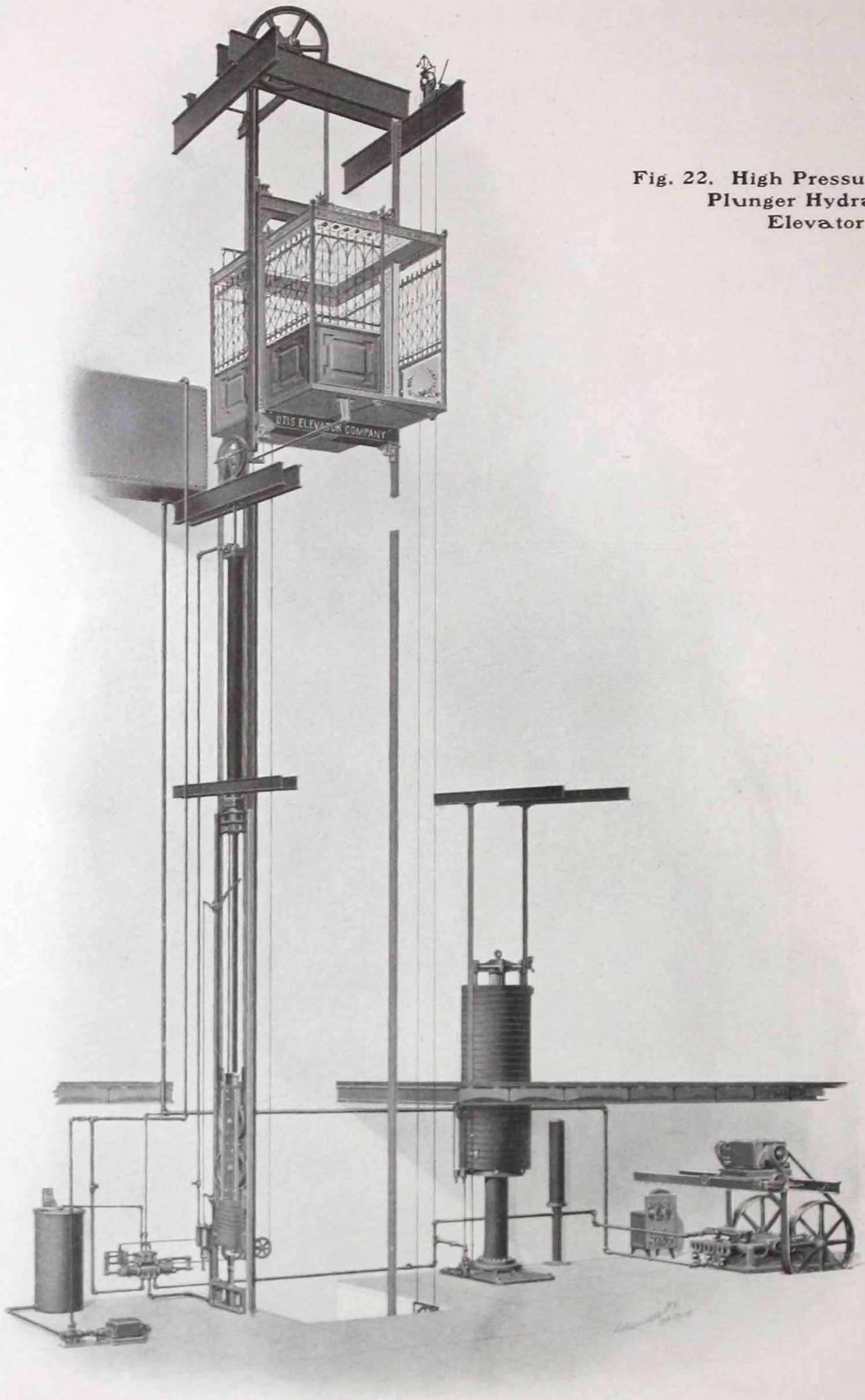


Fig. 22. High Pressure Inverted Plunger Hydraulic Elevator

HIGH PRESSURE HYDRAULIC ELEVATOR

INVERTED PLUNGER TYPE FOR PASSENGER OR FREIGHT SERVICE

THE Otis High Pressure Inverted Plunger Elevator illustrated on opposite page is designed to be operated at a water pressure of from 600 to 800 pounds per square inch, to maintain which a weighted accumulator is used as shown in illustration. The cylinder and plunger being small in diameter can be suspended in the hatchway at back of or between the cars. Usually but one accumulator is required for each plant.

The installation shown has a motor-driven triplex pump, pumping directly into the weighted accumulator. The operation of the pump motor is governed by the position of the accumulator weight, which, as it descends, due to the consumption of water by the elevator, closes the electric circuit, admitting current to the motor until the pump delivers the amount of water required to supply the accumulator, and then the circuit is automatically opened. This system can also be installed with steam pumps.

We have many of these elevators in operation and in regular service they show the highest degree of efficiency and economy. A number of the largest elevator plants ever installed are of this type.

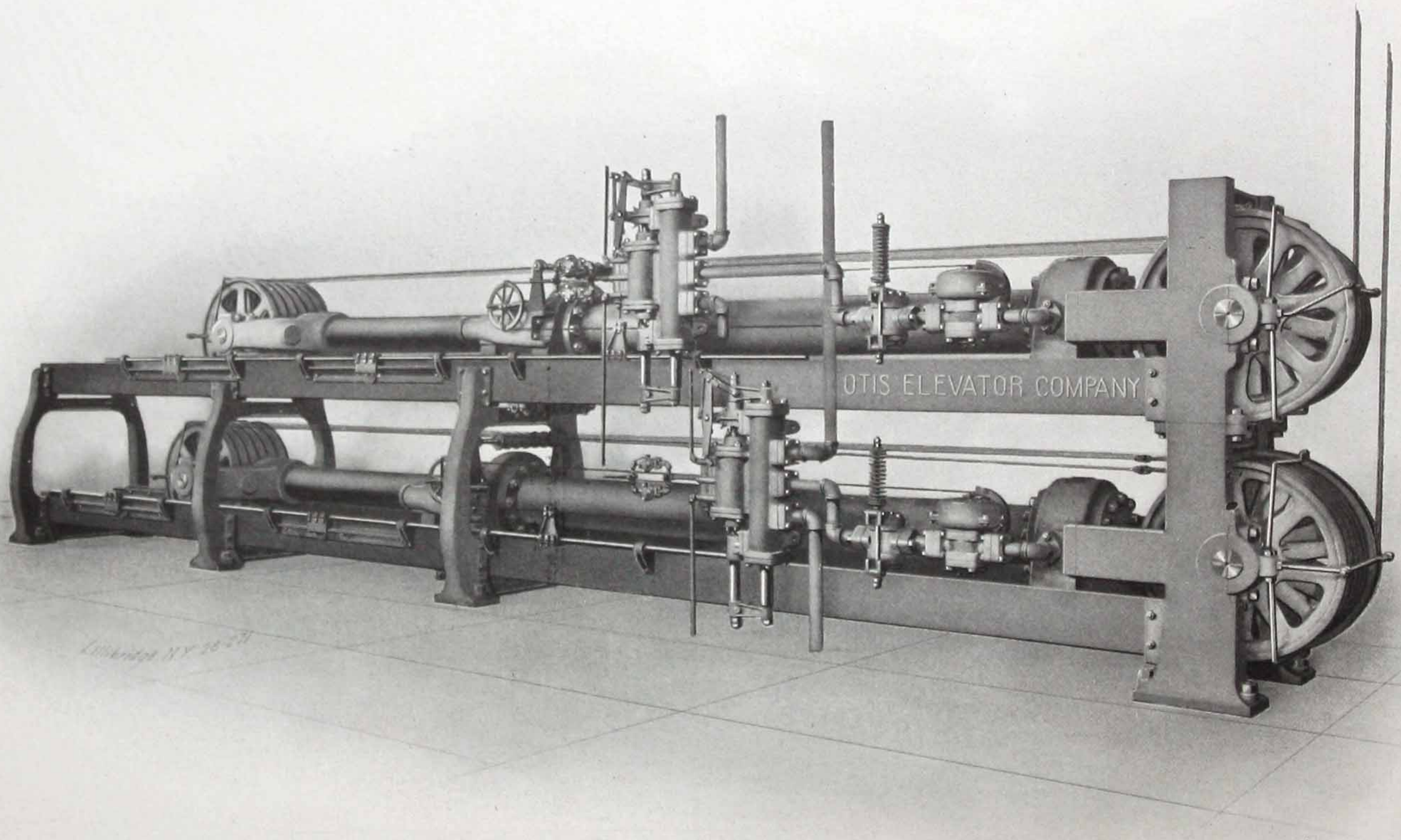
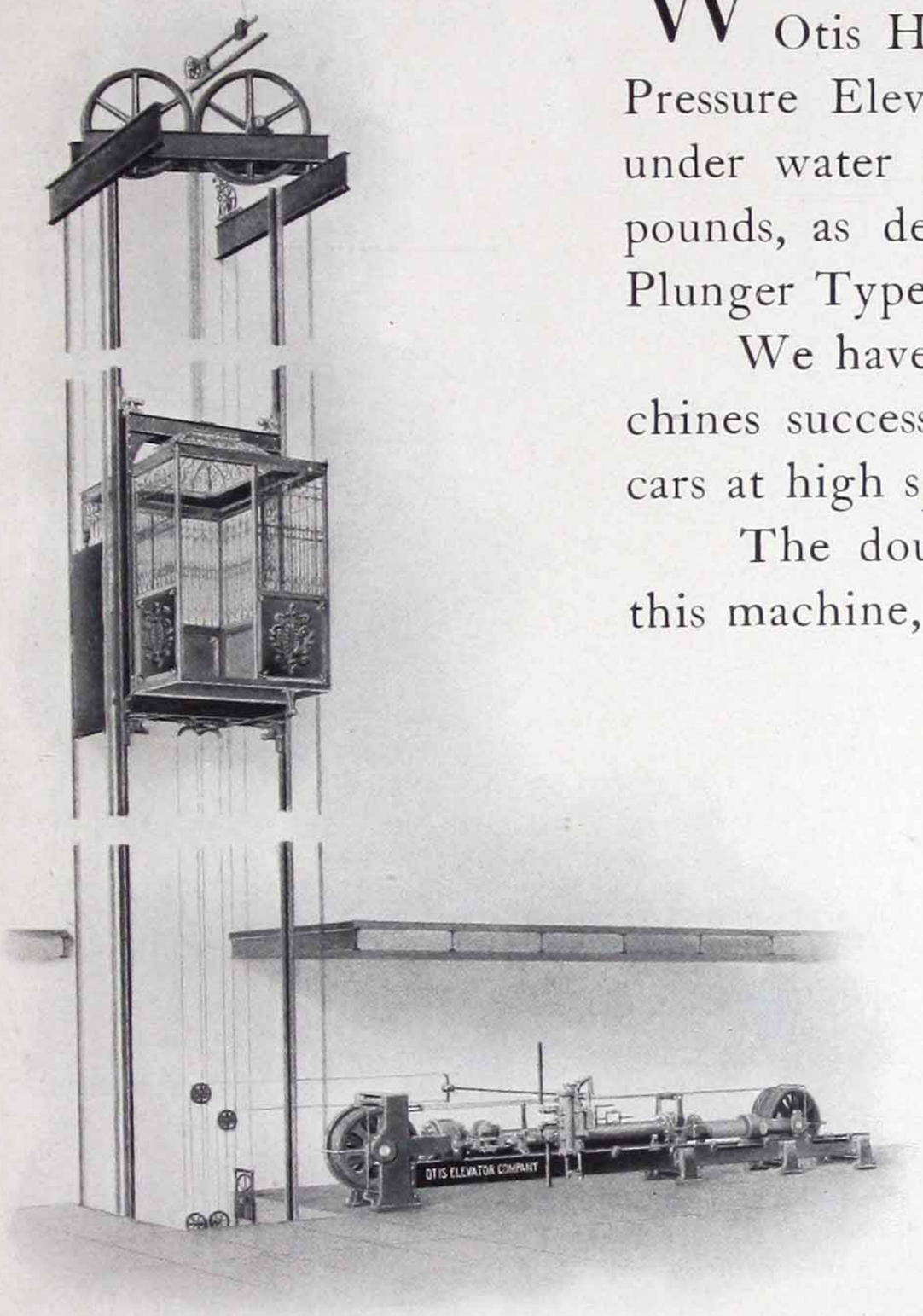


FIG. 23. OTIS HORIZONTAL CYLINDER HIGH PRESSURE ELEVATOR ENGINE
(DOUBLE DECK ARRANGEMENT)

HIGH PRESSURE HYDRAULIC ELEVATOR

WITH HORIZONTAL CYLINDER



WE illustrate on this page the Otis Horizontal Cylinder High Pressure Elevator, designed to operate under water pressures of 600 to 800 pounds, as described for the Inverted Plunger Type.

We have a number of these machines successfully operating passenger cars at high speeds.

The double deck arrangement of this machine, shown on opposite page, is for the purpose of economizing floor space, the machinery for operating two cars occupying the same floor area as ordinarily required for one.

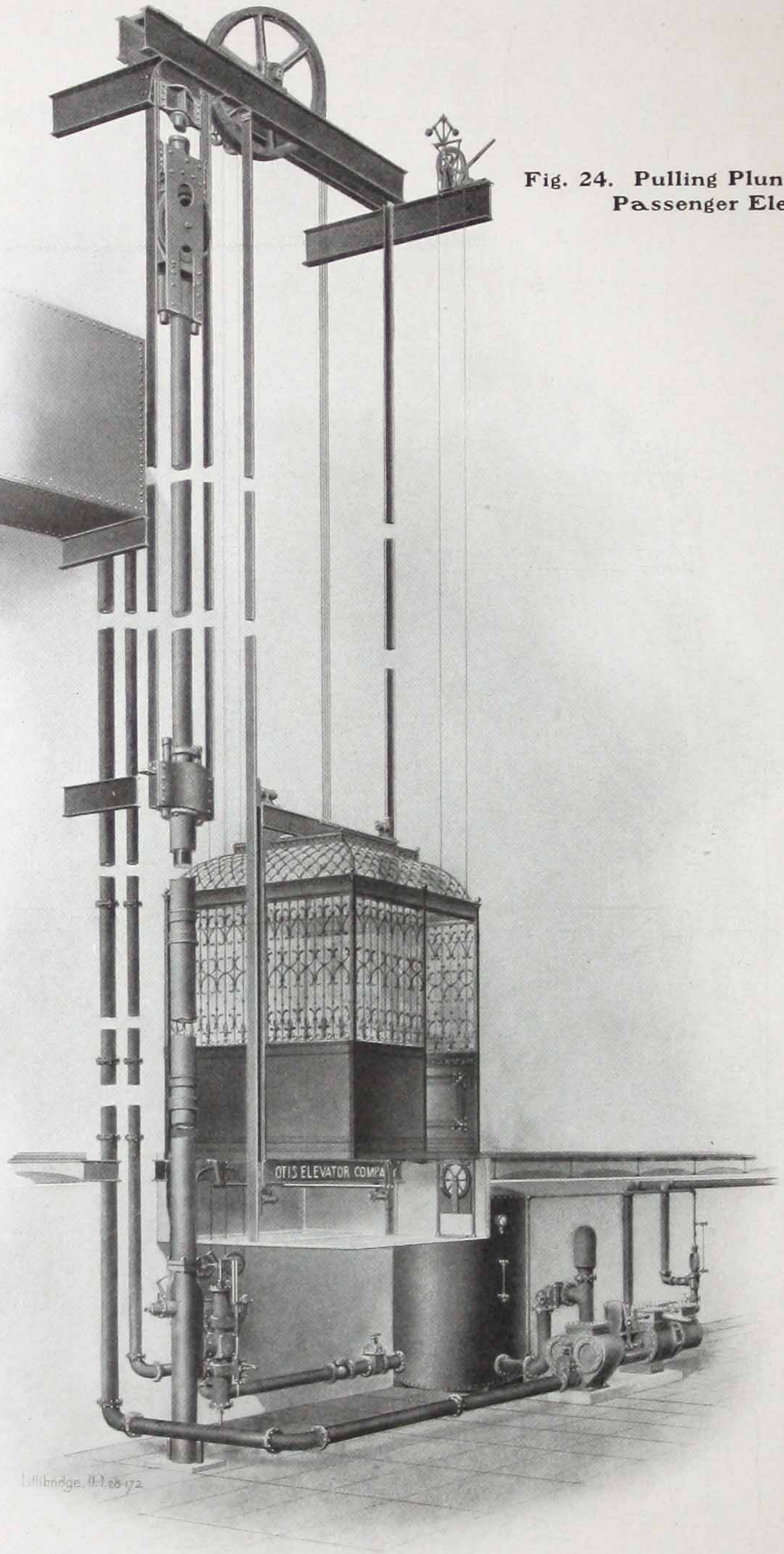


Fig. 24. Pulling Plunger Hydraulic Passenger Elevator

HYDRAULIC PASSENGER ELEVATOR

PULLING PLUNGER TYPE FOR PASSENGER SERVICE

THE illustration shows the Otis Pulling Plunger Type of Hydraulic Elevator, which when lifting the load does not consume water but discharges it from the cylinder.

With this type of elevator the column of water in the cylinder supports a solid steel plunger, and when the valve is opened the weight of the descending plunger forces the water out of the cylinder into the discharge tank and lifts the car and its load.

In descending, water is delivered into the cylinder at sufficient pressure to raise the plunger and allow the car to descend. The speed is regulated by the amount of water admitted or discharged through the operating valve.

This elevator was designed to meet the requirements of high buildings, and on account of its economy in operation, very high speed, and the quickness with which stops and starts can be made, ranks high among hydraulic elevators.

As this machine is operated under a medium pressure, rarely exceeding 300 pounds per square inch, it is possible to use the compression-tank system, but it is also perfectly adapted to the weighted accumulator system. The illustration shows a compound duplex pump with compression and discharge tanks, together with the necessary piping connections.

The compression tank is usually placed in the basement and the discharge tank either on the roof or in any convenient location at least as high as the top of the cylinder, effectually preventing the water discharging from the cylinder faster than it is displaced by the plunger and also keeping the plunger from attaining greater than normal speed.

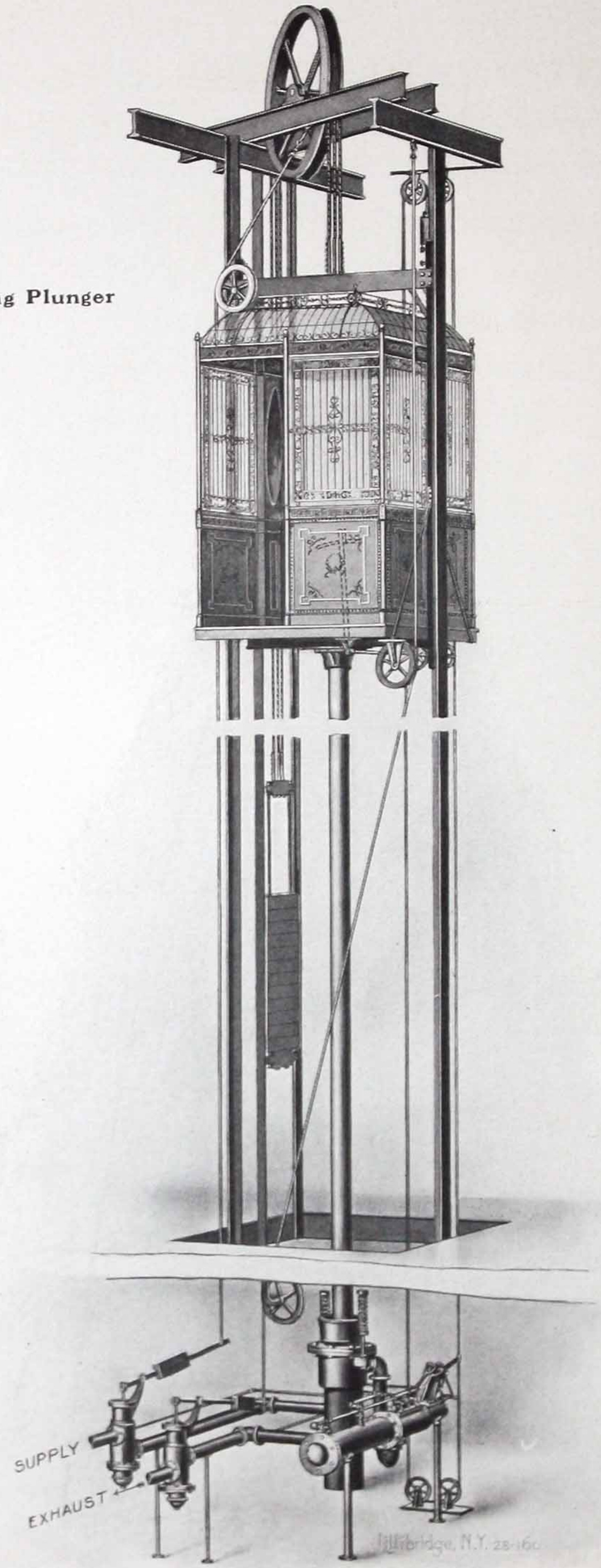


Fig. 25. Direct-acting Plunger Elevator

DIRECT-ACTING PLUNGER ELEVATOR

FOR PASSENGER OR FREIGHT SERVICE

THE Direct-acting Plunger Elevator, illustrated on the opposite page, represents our modernization of the primeval hydraulic lift. It consists of a cylinder set vertically in the ground directly under the car, and of length slightly greater than the travel of the elevator. In this cylinder is a plunger of the same length, carrying a car on its upper end. The bottom of the plunger is supported by an incompressible body of water, and the car cannot descend faster than the water is forced out.

The success of this elevator depends largely upon the merits of the operating mechanism. As a result of many years of experiment and study, we have perfected and patented a system of valves which gives absolute ease and smoothness of control.

As it is necessary to sink the hole to a depth equal to the height of the building, the nature of the soil has a direct bearing on the time of completion and cost of the installation.

For many years we have installed this type of elevator for both passenger and freight service, and have numbers of equipments of this kind in operation in all classes of buildings throughout the country.

PLUNGER SIDEWALK HOIST—HYDRAULIC ASH LIFT

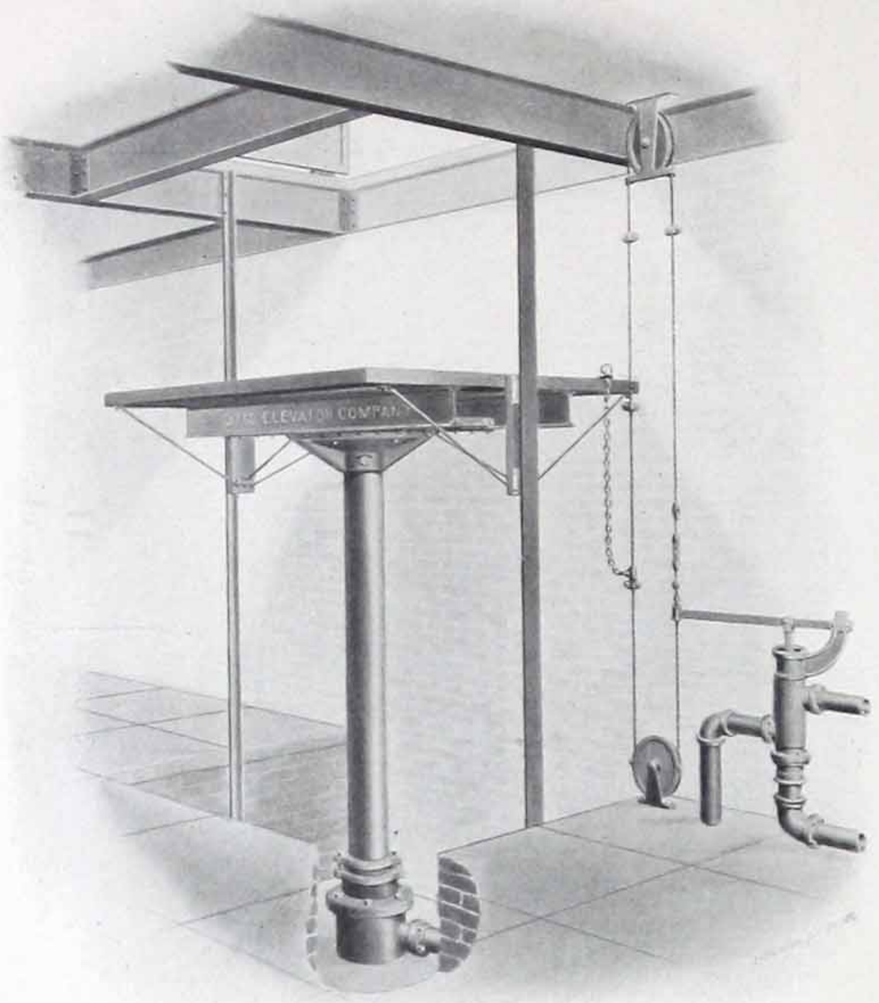


FIG. 26. PLUNGER SIDEWALK HOIST

THE illustration, Figure 26, shows the Plunger Elevator arranged as a sidewalk hoist, a service for which it is very well adapted, as the very simple elevator machinery can be placed underneath the platform. If required, the elevator can be constructed so as to raise the platform any reasonable height above the sidewalk, for convenience in loading or unloading trucks.

FIGURE 27 shows the Otis Hydraulic Ash Lift, for raising ashes, etc., from the cellar to the sidewalk. The extreme simplicity of construction and operation and the extraordinary compactness strongly recommend this type of hoist for this class of service.

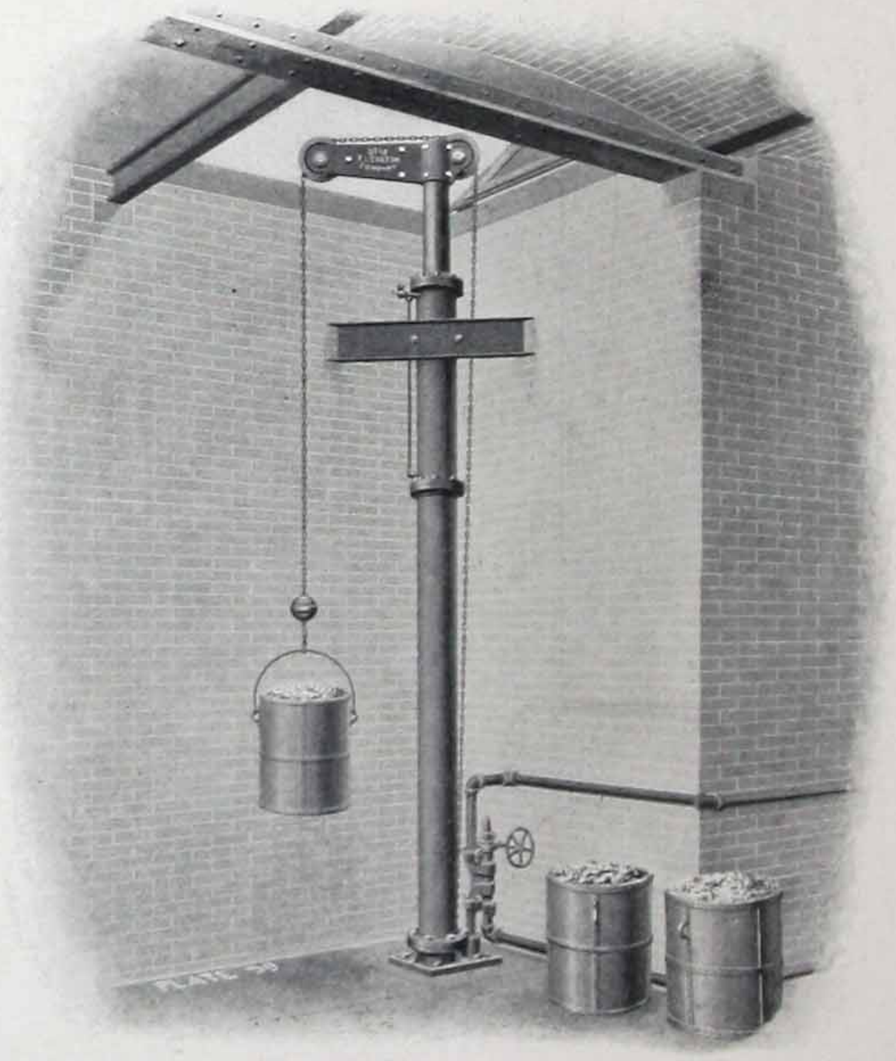


FIG. 27. HYDRAULIC ASH LIFT

DIRECT STEAM PASSENGER ELEVATOR

FIGURE 28 illustrates the Otis High-speed, Worm-geared Passenger Elevator Engine. This design is the result of much experiment to perfect a steam engine which would combine speed, smoothness of running, and ease of control, which are essentials in any elevator for passenger service.

For economical reasons this type of elevator has been largely superseded by the electric, but for certain locations, and where electric current cannot be obtained, it holds its place as the highest type of the steam passenger elevator.

Our engine, if required, is capable of developing a car speed of 400 feet per minute, which no other elevator builders have been able or willing to guarantee with this style of elevator.

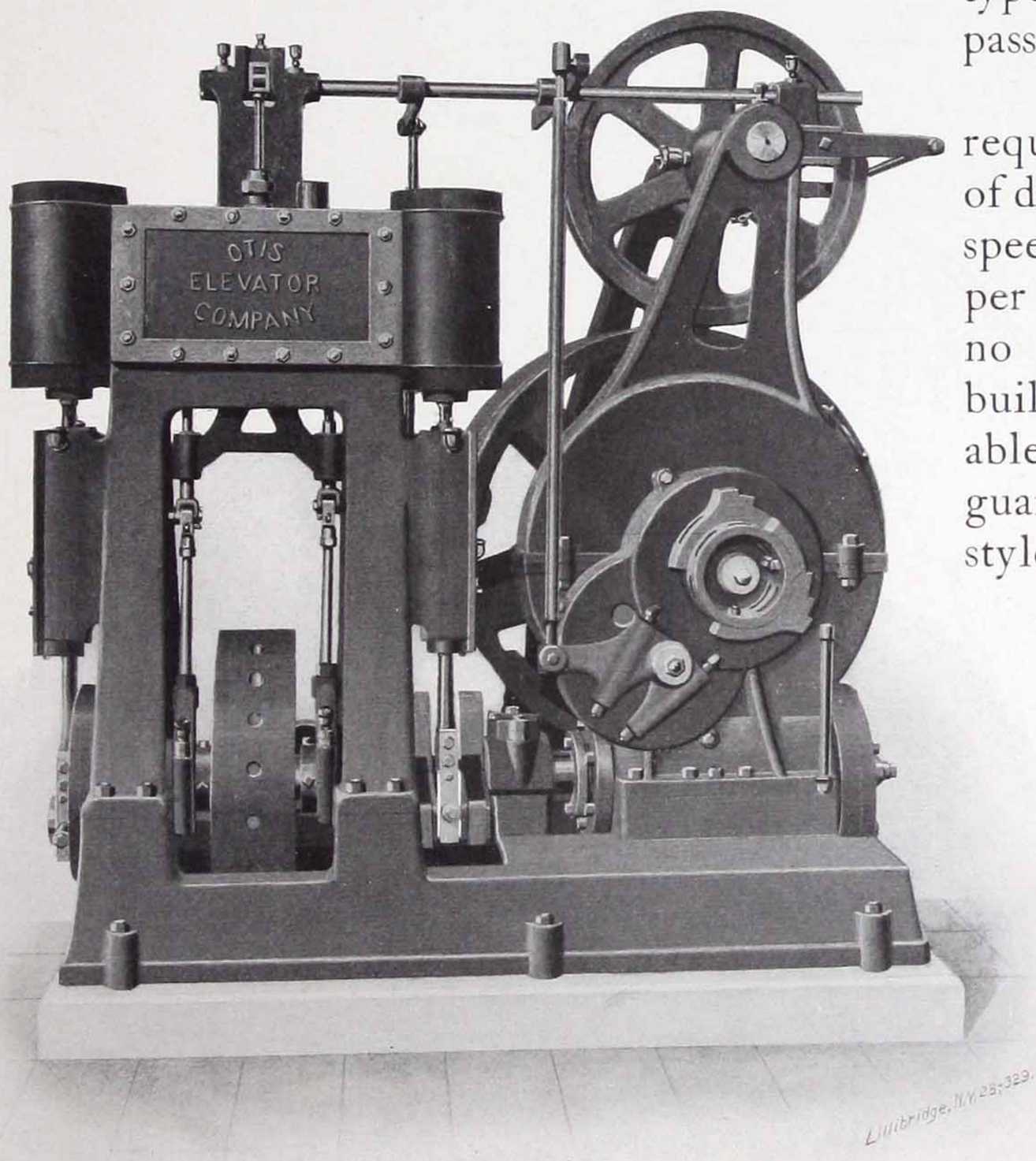


FIG. 28. WORM-GEARED STEAM PASSENGER ELEVATOR ENGINE

BELTED STEAM FREIGHT ELEVATOR

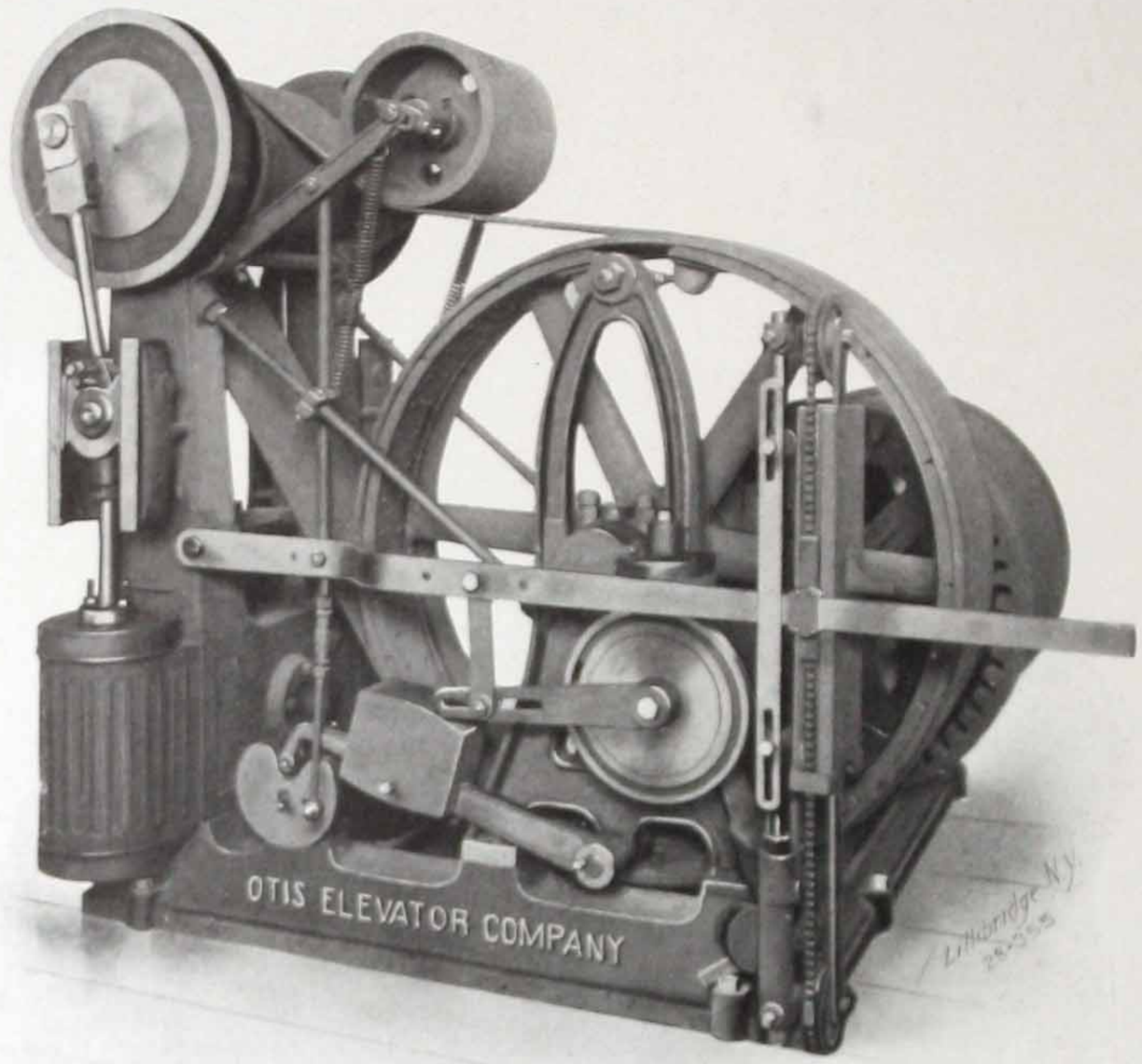


FIG. 29. BELT AND GEARED STEAM FREIGHT ELEVATOR ENGINE

THE engine shown in Figure 29 was at one time considered the best for freight purposes. During the last few years it has given way to the modern hydraulic and electric elevators, but it is still recognized as the standard machine of its class.

Hundreds of these elevators have been in continuous operation for over twenty years in prominent mercantile buildings in New York, Chicago and other cities, and are giving satisfactory service to-day. The general construction of the engine remains substantially as first designed, but devices have been added to still further increase its safety and facilitate its control.

S T E A M H O I S T

FOR USE ABOARD SHIP

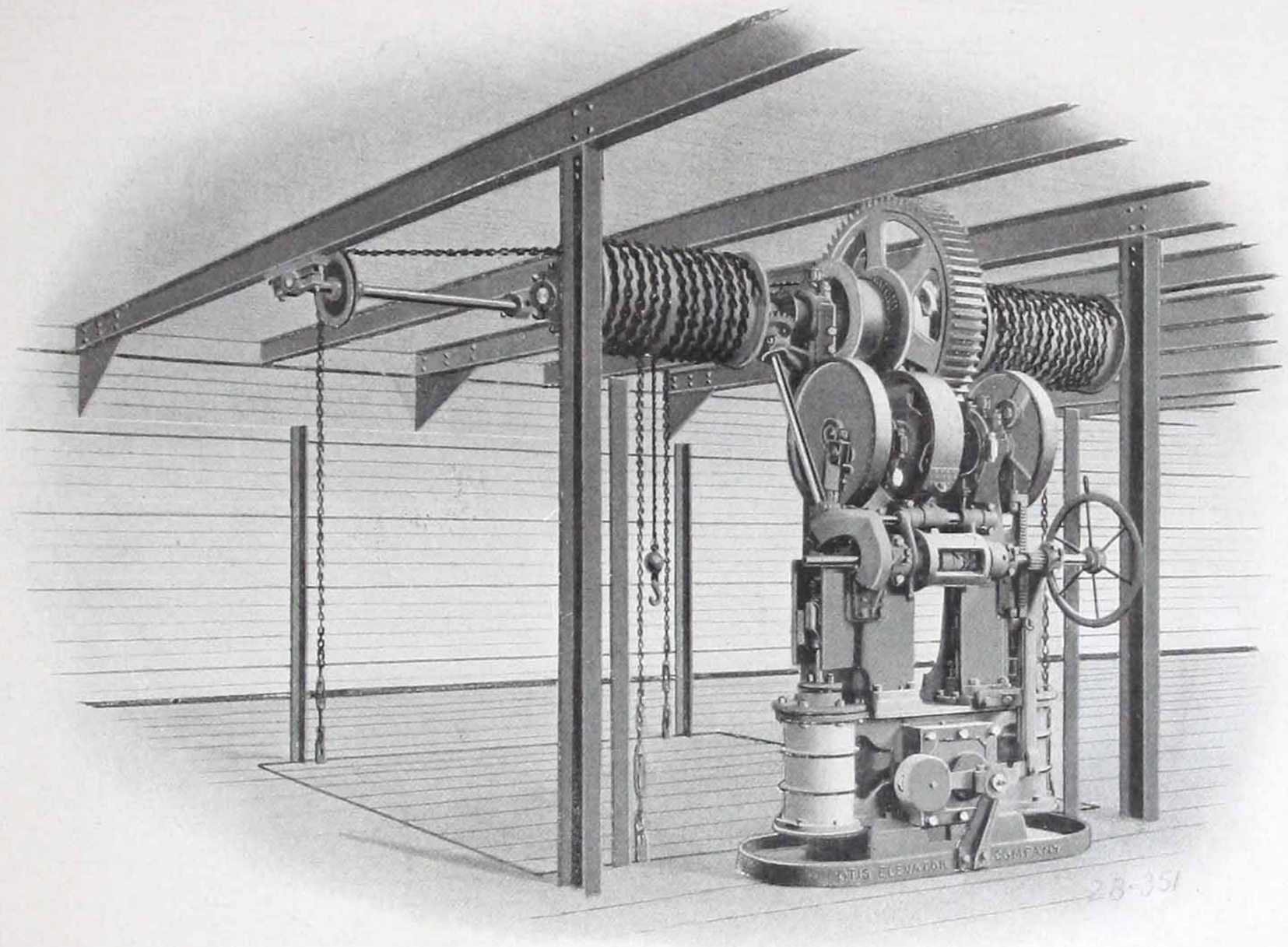


FIG. 30. STEAM HOIST FOR USE ABOARD SHIP

FIGURE 30 shows a new type of Steam Hoist designed particularly for use aboard ships.

The engine can be fitted with an automatic device whereby, at the beginning of a loading operation, the engine is automatically brought to a stop when the platform reaches the lowest deck. When this deck is completely loaded, the device is readjusted to stop the engine automatically when the platform is lowered to the next higher deck, and so on. When all the decks are completely loaded, the platform is lowered to the bottom of the hatchway. The main winding drums are then thrown out of gear and the auxiliary whip hoist can be used to fill the hatchway. In unloading, these operations are, of course, reversed.

DOUBLE-BELT ELEVATORS

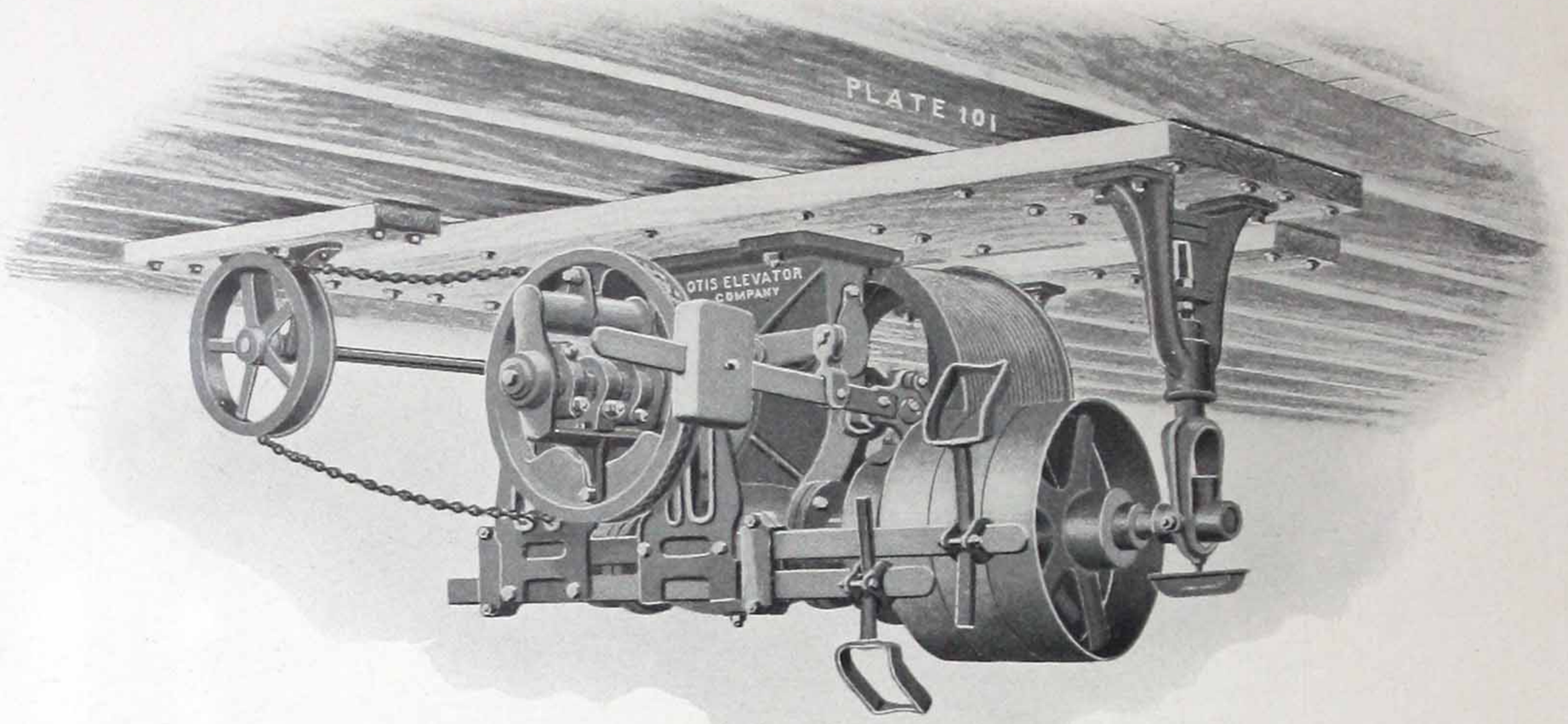


FIG. DOUBLE-BELT CEILING MACHINE

THIS is one of the oldest types of power Freight Elevator and is driven by belts from a line shaft, or by a gas engine or electric motor through a countershaft. A large number of elevators of this type are used on account of the comparatively low cost and where individual motive power for the elevator is not feasible nor desired. The winding machine is usually attached to the ceiling, as shown in Figure 31.

This type is made in sizes to suit capacities up to 6000 pounds.

DOUBLE-BELT ELEVATORS

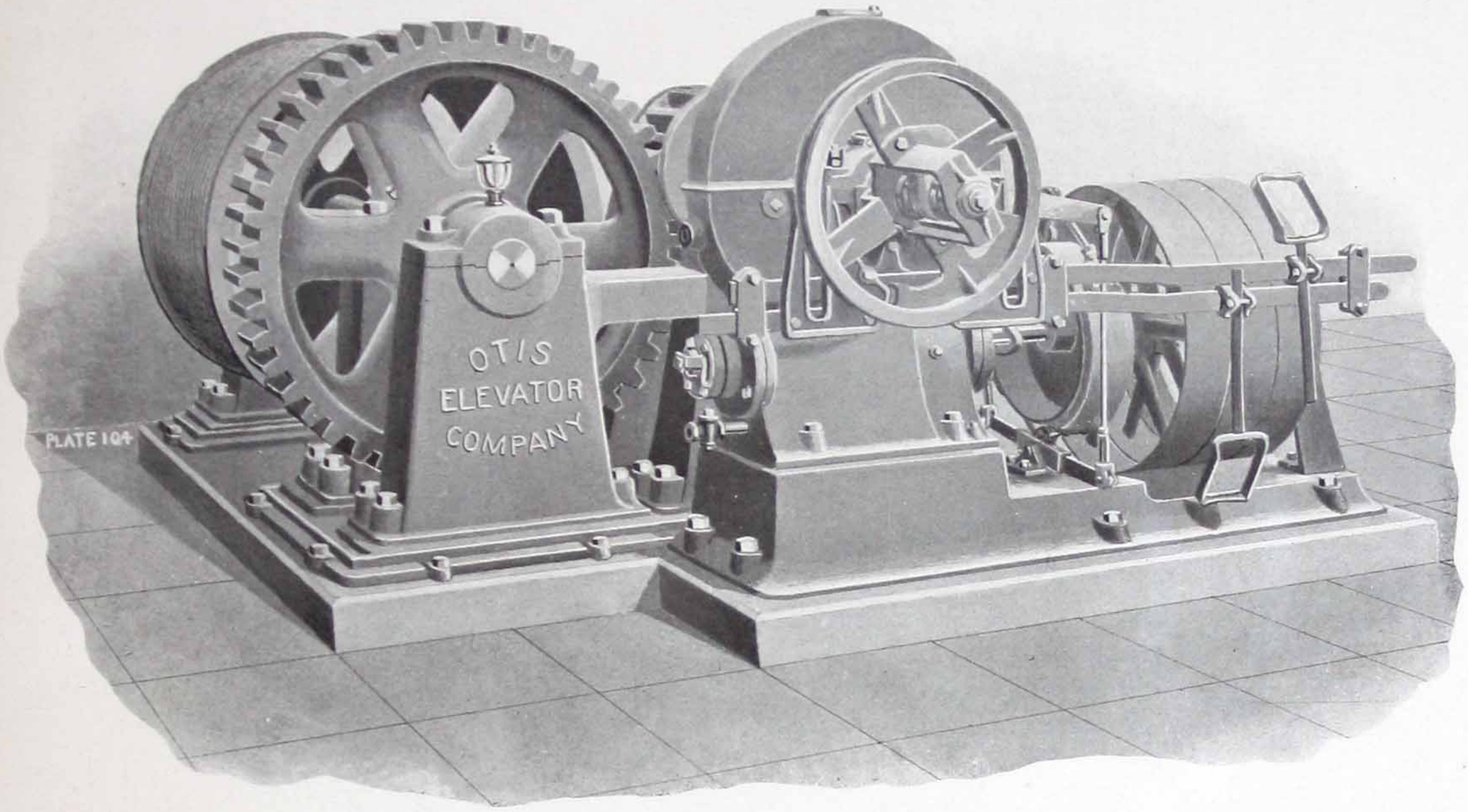


FIG. 32. DOUBLE-BELT MACHINE FOR HEAVY DUTY

THE Otis Duplex-geared Belt Machine of the floor type, shown above, the first motion being a worm gear and the second a spur gear, is built for heavy duties up to 16,000 pounds. We also build a similar machine of the ceiling type.

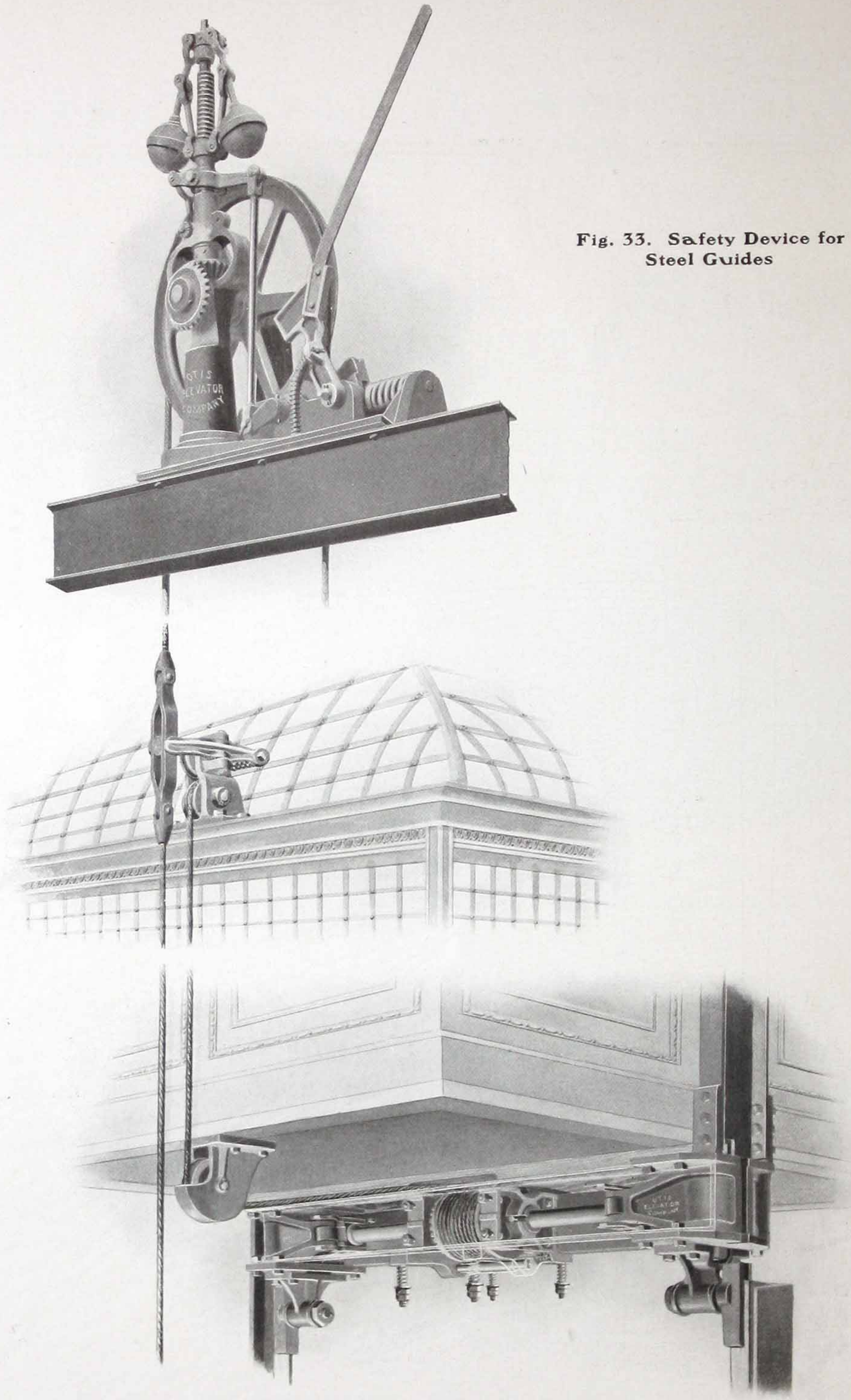


Fig. 33. Safety Device for Steel Guides

SAFETY DEVICES

WHILE a high safety factor is used in the construction of Otis Elevators, each elevator is also provided with special safeguards against all known forms of elevator accidents.

The principle of having a centrifugal governor to operate grips or clutches on the car when it exceeds a predetermined speed does not differ materially from that of thirty years ago, but the greatly increased car travels and speeds of many modern installations necessitate car safeties that will invariably exert a resistance in proportion to the car speed so that the car will slide a distance proportional to its velocity at the time the safety acts.

To meet these varying requirements we manufacture a number of devices which have been proven effective and absolutely reliable in actual service, and illustrate on opposite page the Otis Governor directly connected to our Wedge Clamp Safety Device, designed for use in connection with steel tee guides. When the car exceeds its normal speed the governor applies the car safety, the jaws clamping the guide rails with a gradual and constantly increasing pressure, bringing the car to an easy but positive stop.

The illustration on the following page shows the Otis Governor directly connected to our Triple Grip Safety Device, for use in connection with hardwood guides, and for the purpose for which it is designed is equal in effectiveness to the wedge clamp. The illustration on page 51 shows our Steel Frame Platform with Roll Safety Device, which is suited for either passenger or freight service where the car speed is low and a quick, positive stop is not objectionable. Our "Security Retarding Elevator Safety" is the subject of a separate booklet which will be furnished on application.

The best devices known to insure immunity from accident are embodied in the Otis Elevator, and we strongly advise against the possibility of rendering these ineffective by attaching so-called additional safeties without first obtaining our advice, based on years of unequaled experience.

Fig, 34. Safety Device for
Hardwood Guides

FIG. 35. THE OTIS FREIGHT PLATFORM WITH CORRUGATED ROLL SAFETY FOR USE WITH STEEL TEE GUIDES

FIG. 36. ESCALATORS IN THE STORE OF MESSRS. R. H. MACY & CO., NEW YORK

SHOWING the upper landing of the first Escalator and the second Escalator in the background. The ample space allowed in which to step from the Escalator is clearly shown, and the moving hand rails and the shunt may also be seen. The Escalators serving the upper floors are located above.

THE ESCALATOR

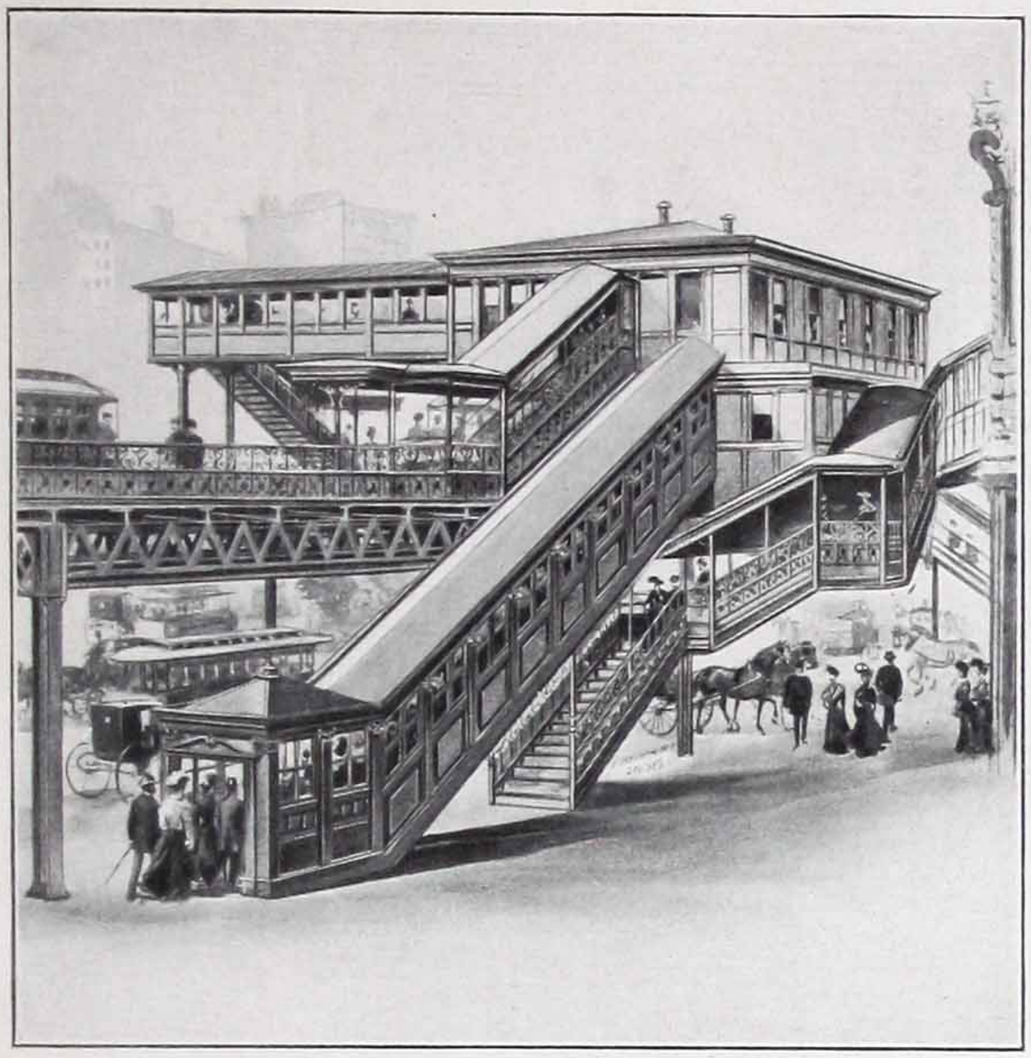


FIG. 37. ESCALATOR AT 33RD STREET STATION
SIXTH AVENUE ELEVATED ROAD

THE Escalator is the ideal device for conveying large numbers of people from one level to another. Its extraordinary capacity — 10,000 people per hour—renders it particularly adaptable for service in department stores, railroad terminals, and underground and elevated railway stations. The Escalator is a continuous carrier, and as such it possesses advantages which may briefly be stated as follows: "The elevator door is always open."

The Escalator is a perfect staircase at all times, whether in motion or at rest. The steps are always horizontal. At the landings the steps travel horizontally, flush with the floor, for an interval more than sufficient to meet the requirements of the aged and infirm, thereby rendering the Escalator not only available to all classes and conditions of the public, but assuring absolute safety. A traveling hand rail at each side of the Escalator, moving at the same rate as the steps, is provided for the convenience of those accustomed to using a hand rail on stationary stairways. Escalators may be built for ascent or descent, or reversible at will. They may be operated continuously or started and stopped by push button where continuous operation is not desired. Escalators may be seen in operation in various stores and elevated railroad stations. Among the most complete equipments are Messrs. R. H. Macy & Co., New York, first to fifth floors; Messrs. Henry Siegel & Co., Boston, basement to fifth floor, ascending and descending; Manhattan Street Station, New York Subway, ascending and descending.

The Escalator was awarded Grand Prix, Paris Exposition, 1900.

Detailed information about the Escalator, with illustrations of various installations, will gladly be sent upon request.

INCLINE RAILWAY

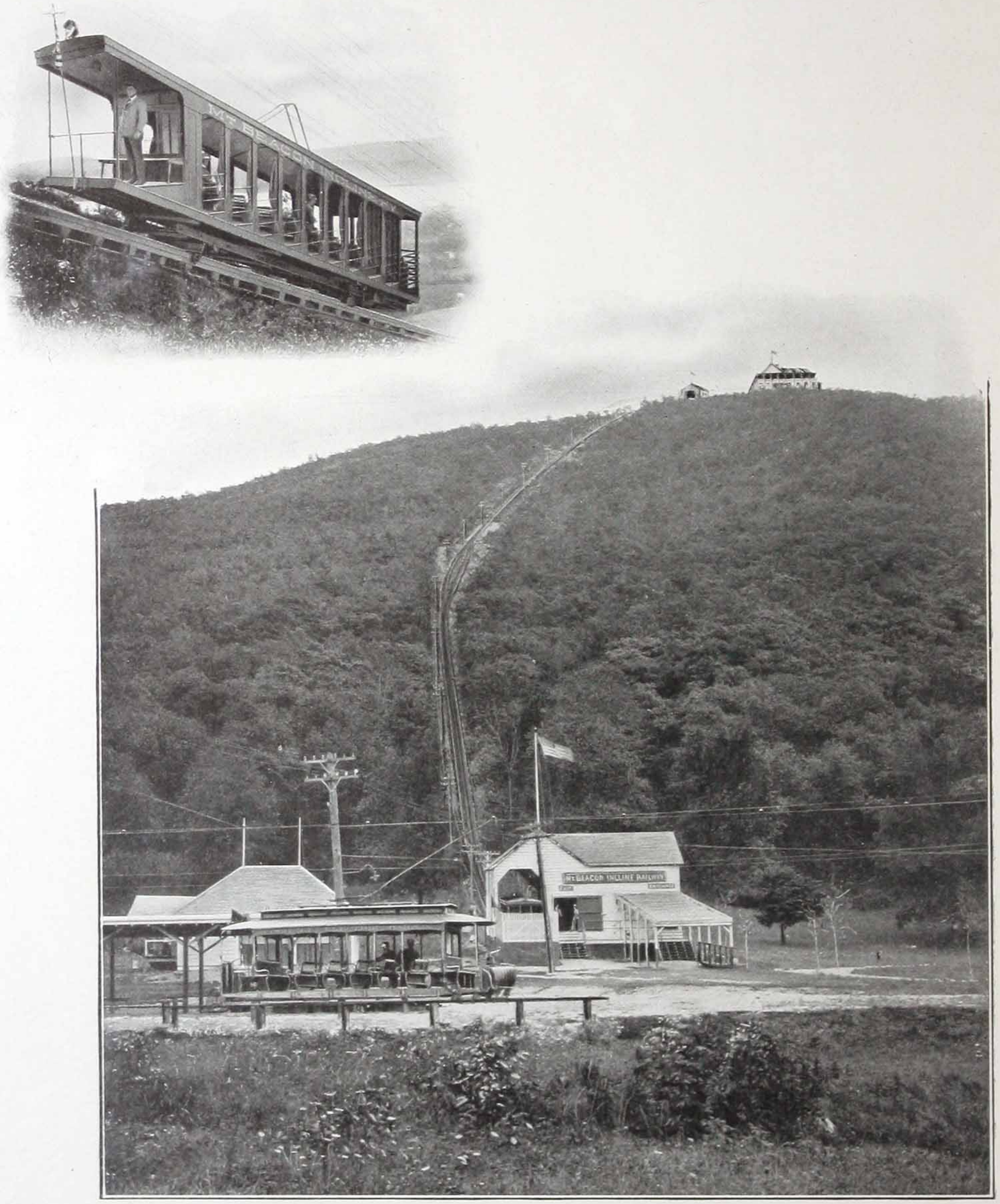
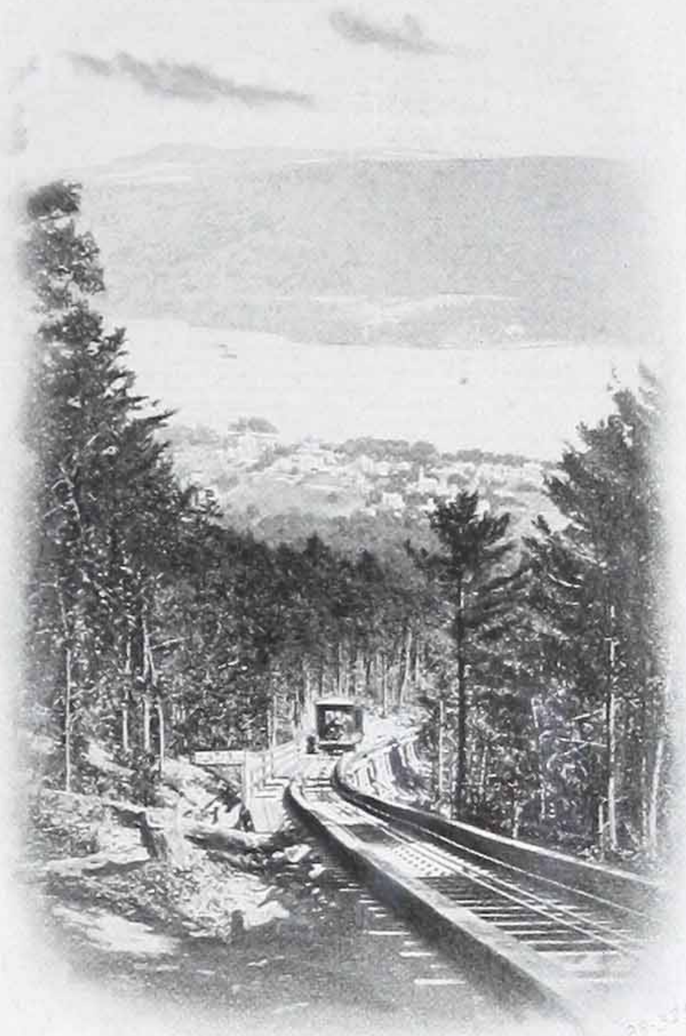


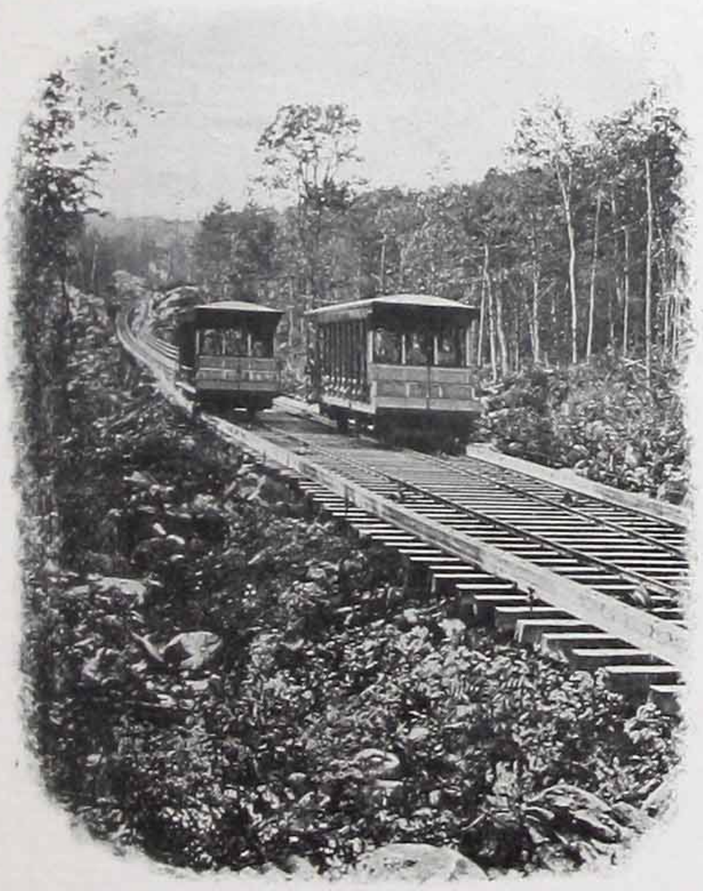
FIG. 38. MT. BEACON INCLINE RAILWAY

INCLINE RAILWAY

THE Mt. Beacon Incline Railway, shown on page 54, was built by this company. The length of this road is 2200 feet, with a rise of 1200 feet. The average grade is 64 per cent. The speed of each car is 500 feet per minute and the seating capacity 54 persons. Each car is equipped with the Otis double-grip safety device. The Otis Electric Hoisting Engine for operating these cars is provided with two 75-horse-power electric motors controlled by the Otis electric switch and magnet system.



The Catskill Mountain Incline Railway was also built by us. This road is 1½ miles long, with a rise of 1630 feet and a maximum grade of 40 per cent. The cars are operated by heavy cables connected to Corliss engines at the upper terminal.



We also give a glimpse, in the two small vignettes on this page, of the Lake George Incline Railway.

This incline railway is about 7000 feet long, with a rise of 1600 feet and a maximum grade of 46 per cent.

The motive power is steam, using two Otis duplex engines.

The carrying capacity is sixty people, at a speed of eight miles per hour.

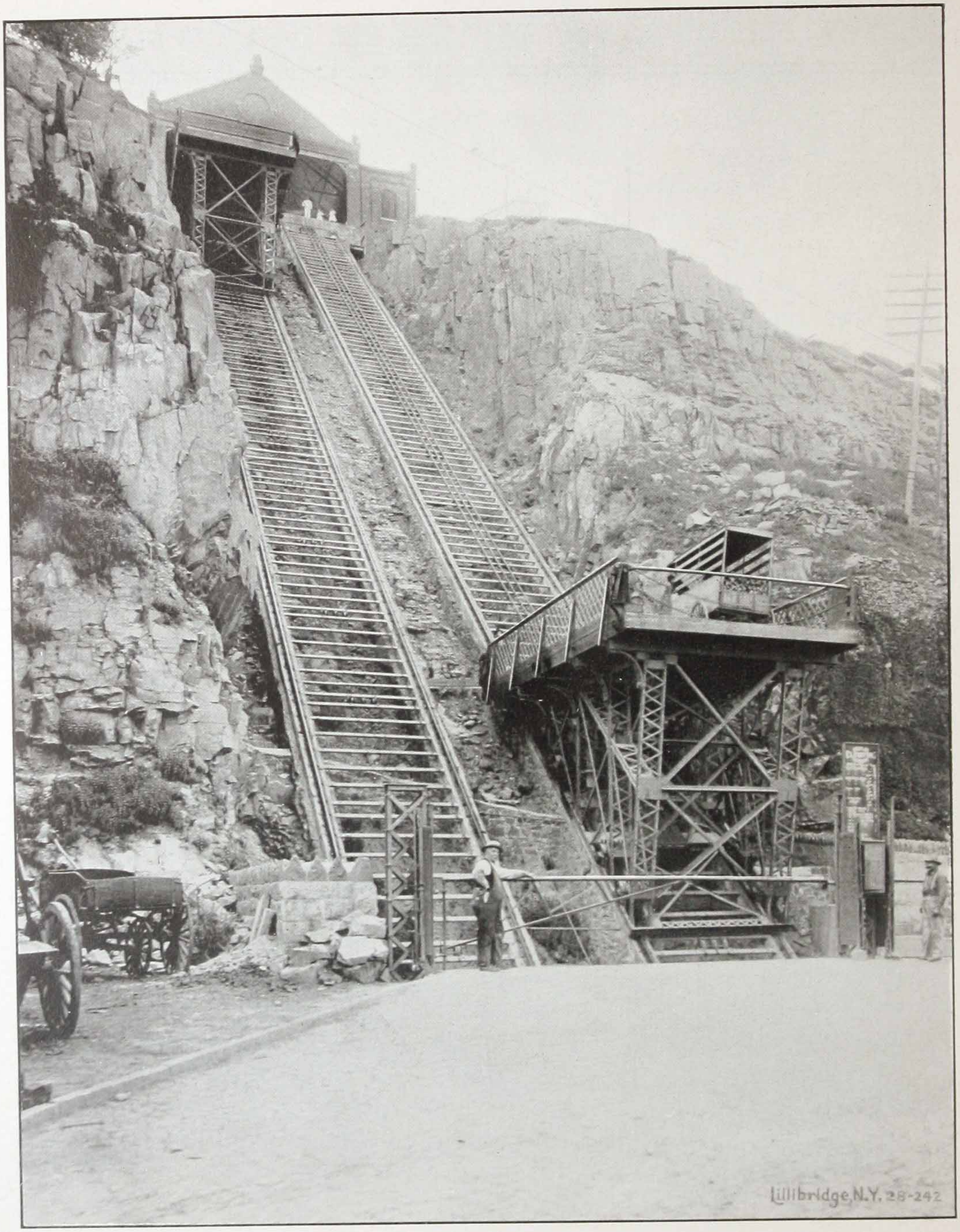


FIG. 39. WEEHAWKEN INCLINE RAILWAY

WEEHAWKEN INCLINE RAILWAY

FIGURE 39 shows the Weehawken Incline Double-track Railway, built by the Otis Elevator Company. The cars for passengers and vehicles are 20 feet wide by 40 feet long, capable of carrying a load of 50,000 pounds at a car speed of 300 feet per minute. The engines are electric and are operated by 300-horse-power motors. The car travel of this incline is 300 feet; grade, 72 per cent.

OTIS ELEVATOR AND EIFFEL TOWER

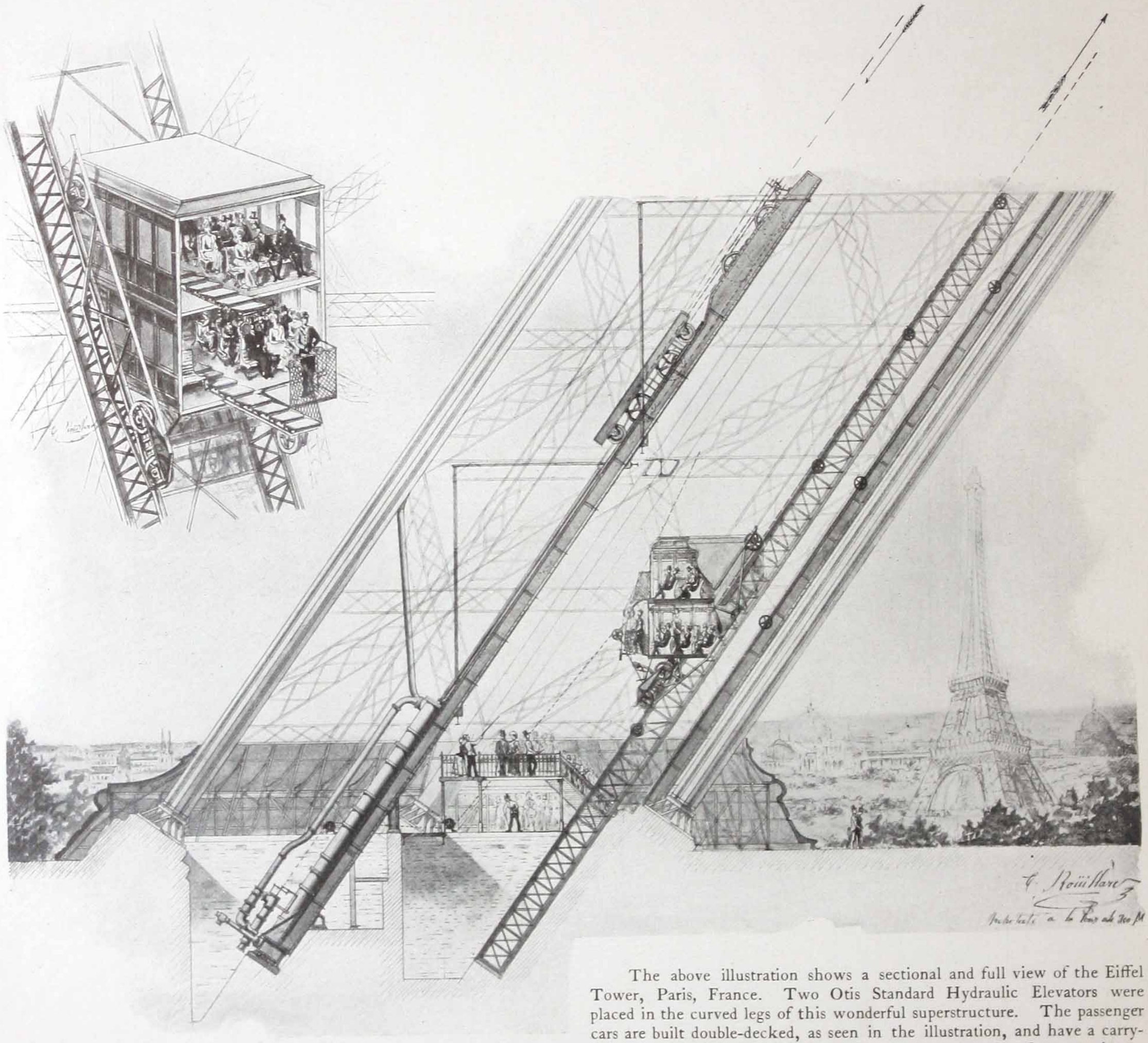


FIG. 40. EIFFEL TOWER

The above illustration shows a sectional and full view of the Eiffel Tower, Paris, France. Two Otis Standard Hydraulic Elevators were placed in the curved legs of this wonderful superstructure. The passenger cars are built double-decked, as seen in the illustration, and have a carrying capacity of fifty people at a speed of from 400 to 600 feet per minute. The power employed is the hydraulic-pressure tank system.

DEPOT ENTRANCE, GLASGOW HARBOR TUNNEL

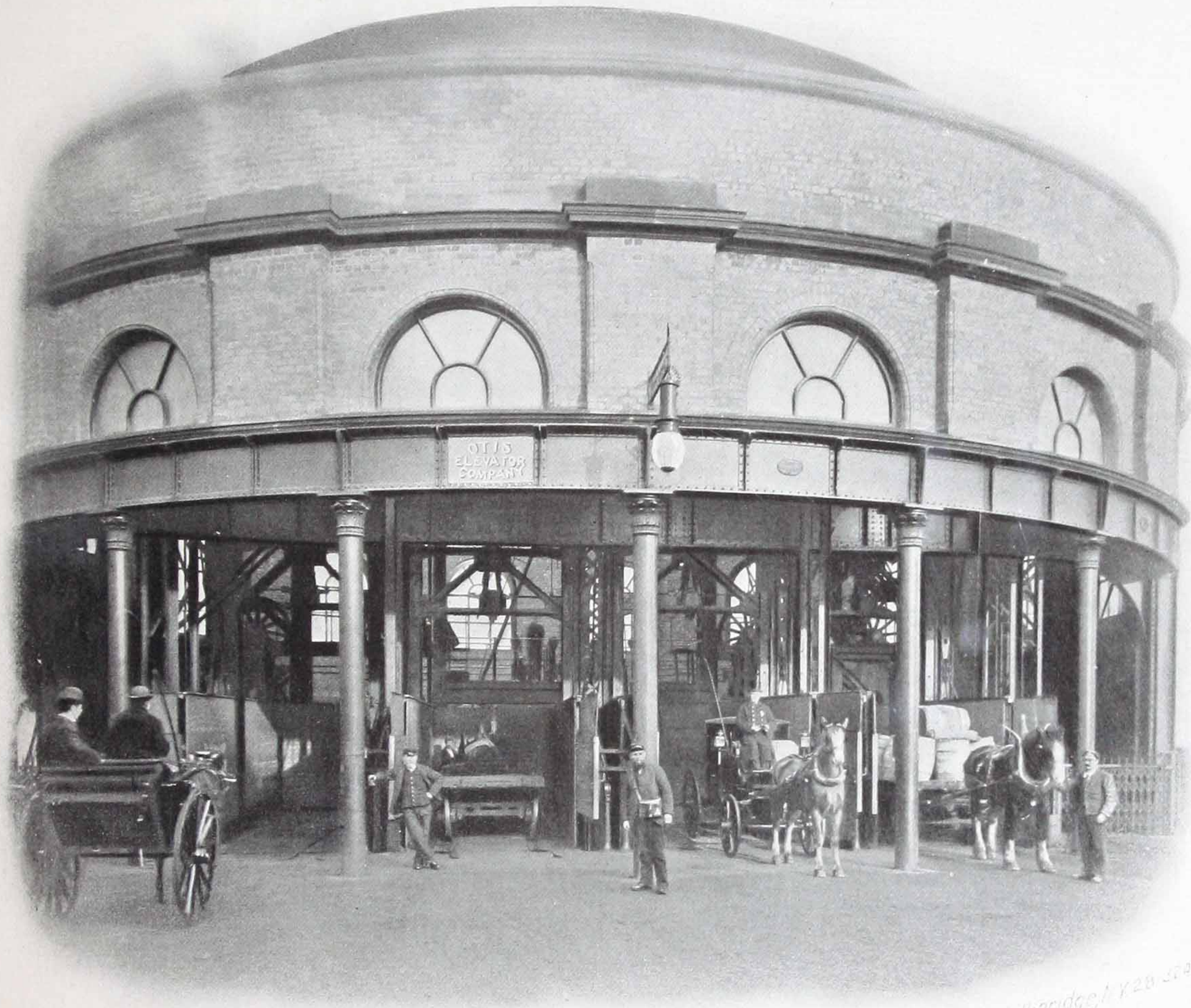
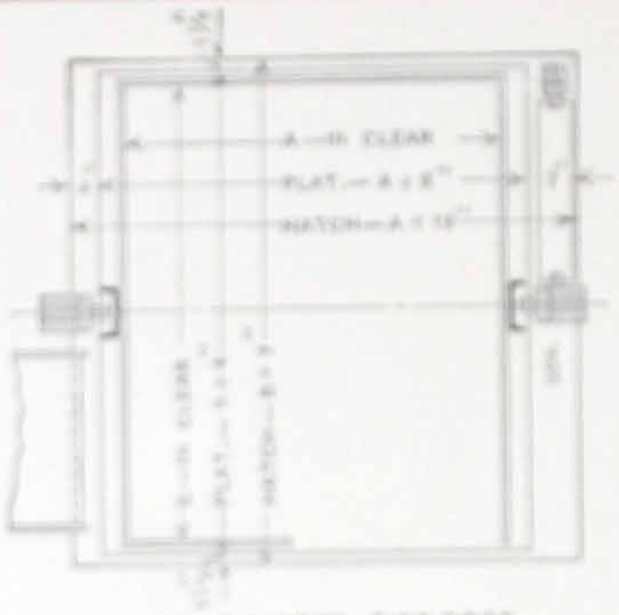


FIG. 41. DEPOT ENTRANCE, GLASGOW HARBOR TUNNEL

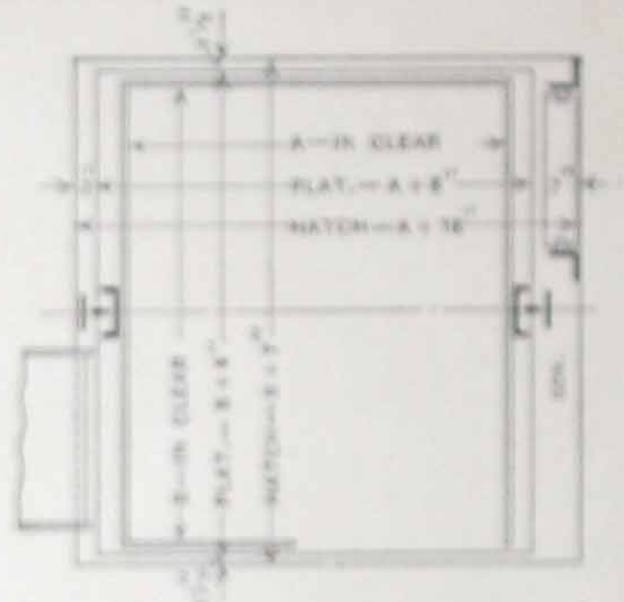
The above illustration shows the entrance depot to Glasgow Harbor Tunnel Elevators, built and erected by us. The plant consists of twelve elevators, having a car travel of 80 feet. Platforms are 10 feet wide by 28 feet long, giving a lifting capacity for wagon and team of horses at a car speed of 250 feet per minute. The elevators are operated under our high-pressure hydraulic system, using steam pumps and accumulators; the hydraulic pressure being 800 pounds.

DIMENSION DIAGRAM PASSENGER ELEVATORS

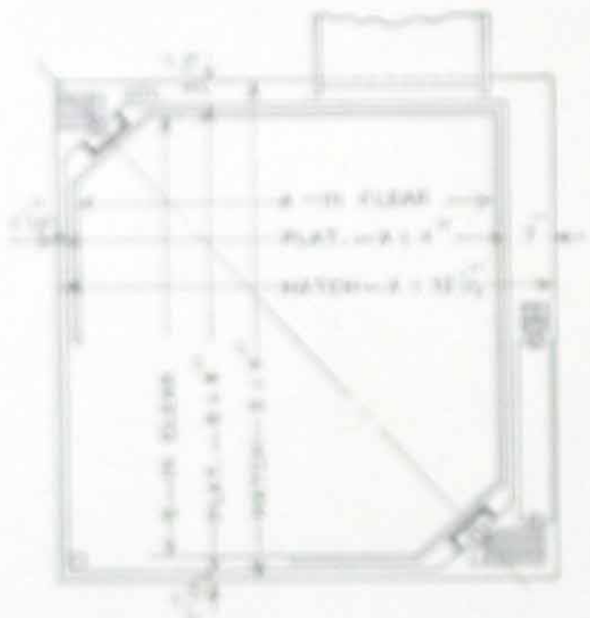
SHOWING RELATION OF HATCHWAY, PLATFORM, AND CAR SIZES



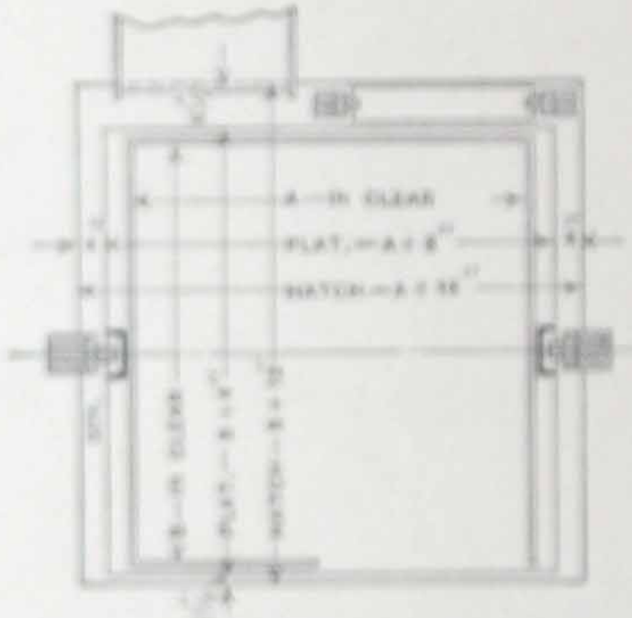
WOOD GUIDES. SIDE POST.
MACHINE AND COUNTERWEIGHT AT SIDE.



STEEL GUIDES. SIDE POST.
MACHINE AND COUNTERWEIGHT AT SIDE.



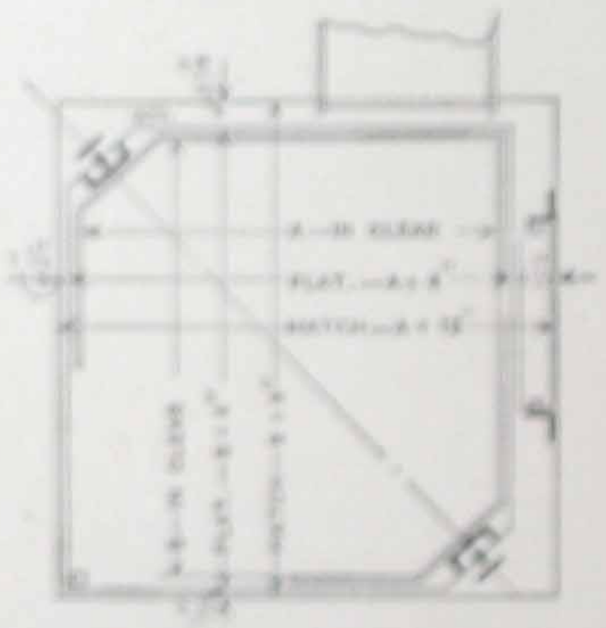
WOOD GUIDES. CORNER POST.
MACHINE AT BACK OR OVERHEAD.
COUNTERWEIGHT AT SIDE.



WOOD GUIDES. SIDE POST.
MACHINE AND COUNTERWEIGHT AT BACK
OR MACHINE OVERHEAD.

STEEL GUIDES. SIDE POST.
MACHINE AND COUNTERWEIGHT AT BACK
OR MACHINE OVERHEAD.

Scale $\frac{1}{4}'' = 1'$

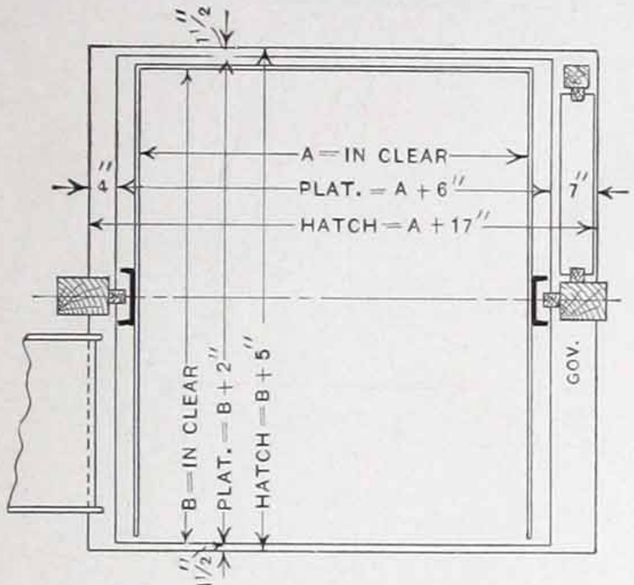


STEEL GUIDES. CORNER POST.
MACHINE AT BACK OR OVERHEAD.
COUNTERWEIGHT AT SIDE.

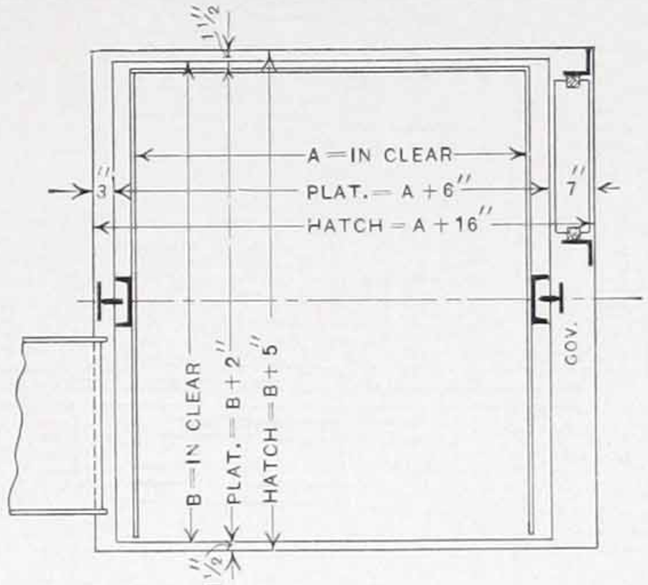
DIMENSION DIAGRAM FREIGHT ELEVATORS

WITH STEEL PLATFORM

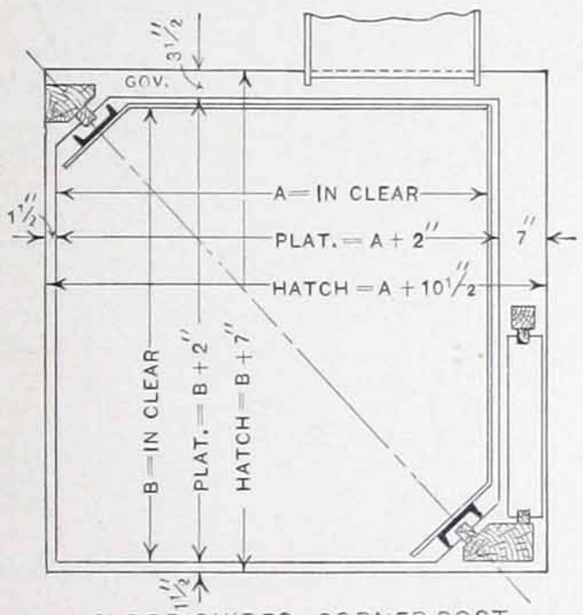
SHOWING RELATION OF HATCHWAY, PLATFORM, AND CAR SIZES



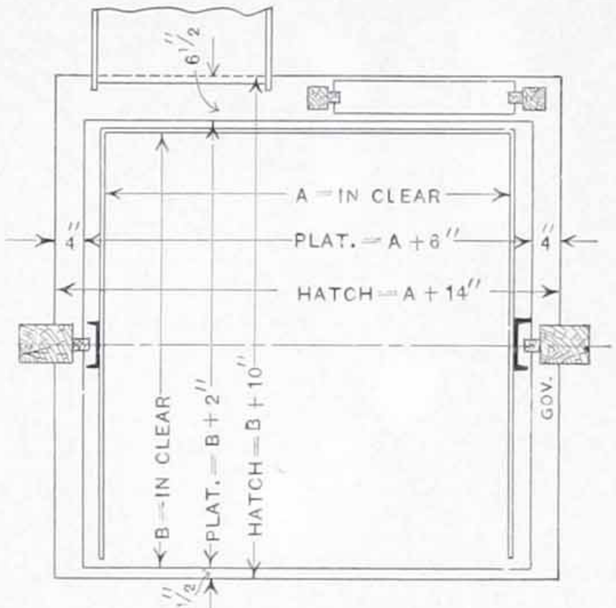
WOOD GUIDES, SIDE POST.
MACHINE AND CWT. AT SIDE.



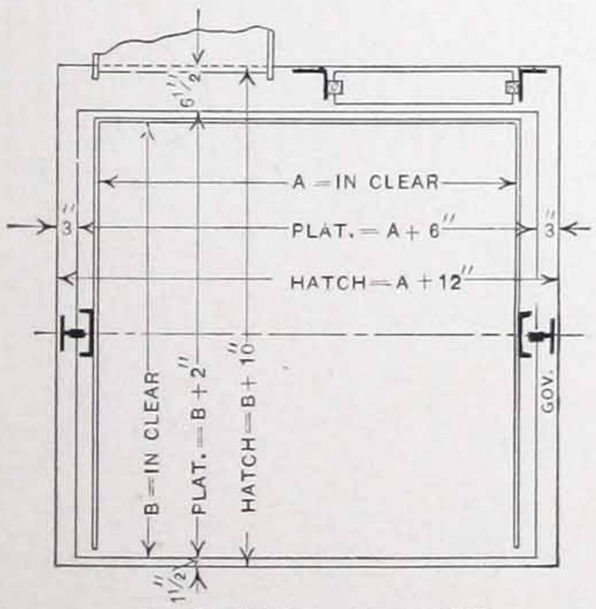
STEEL GUIDES, SIDE POST.
MACHINE AND CWT. AT SIDE.



WOOD GUIDES. CORNER POST.
MACHINE AT BACK OR OVER HEAD.
CWT. AT SIDE

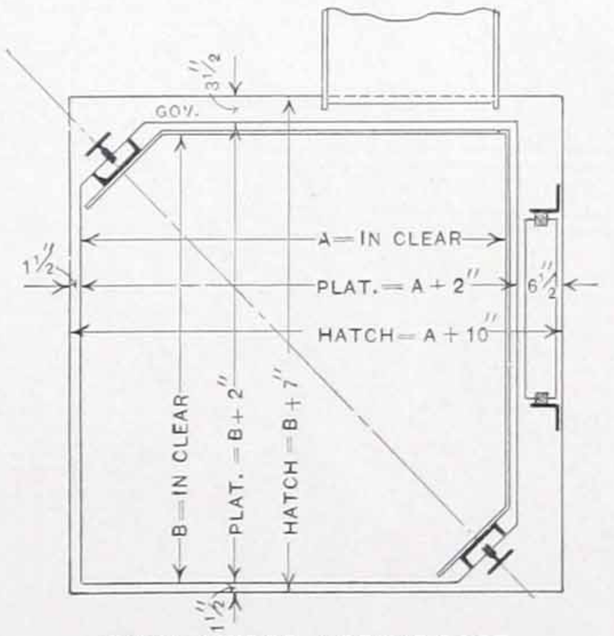


WOOD GUIDES. SIDE POST.
MACHINE AND CWT. AT BACK
OR MACHINE OVER HEAD.



STEEL GUIDES. SIDE POST.
MACHINE AND CWT. AT BACK
OR MACHINE OVERHEAD.

Scale ¼ = 1



STEEL GUIDES. CORNER POST.
MACHINE AT BACK OR OVERHEAD.
CWT. AT SIDE.

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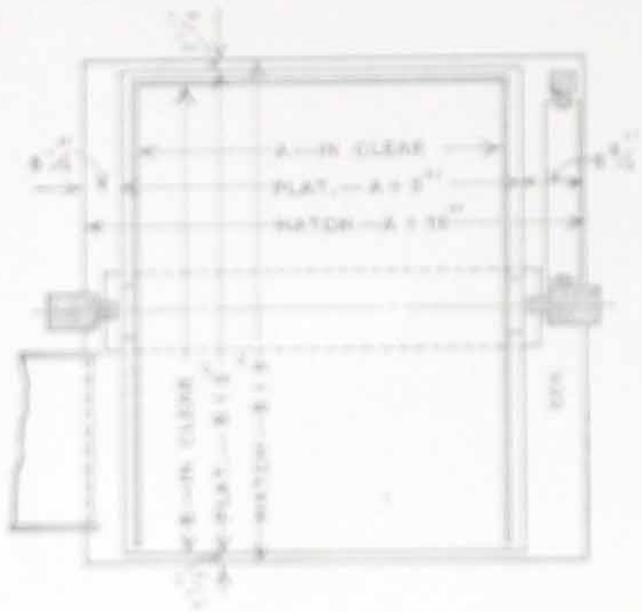
DIMENSION DIAGRAM FREIGHT ELEVATORS

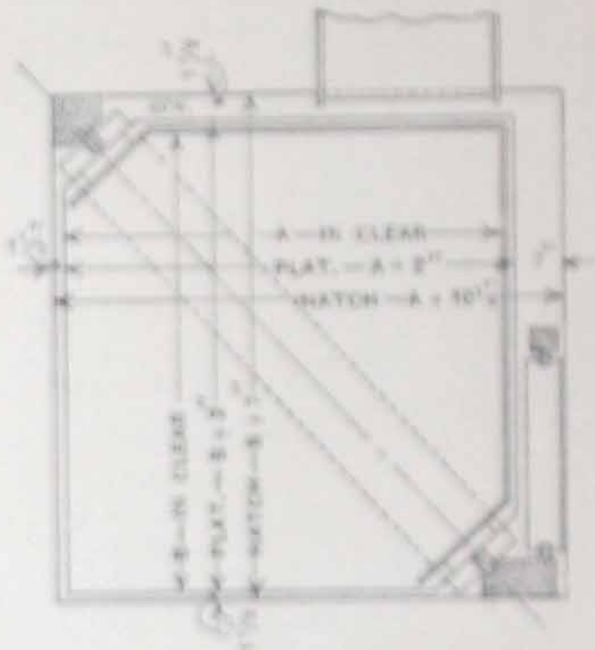
WITH WOOD PLATFORM

SHOWING RELATION OF HATCHWAY, PLATFORM, AND CAR SIZES

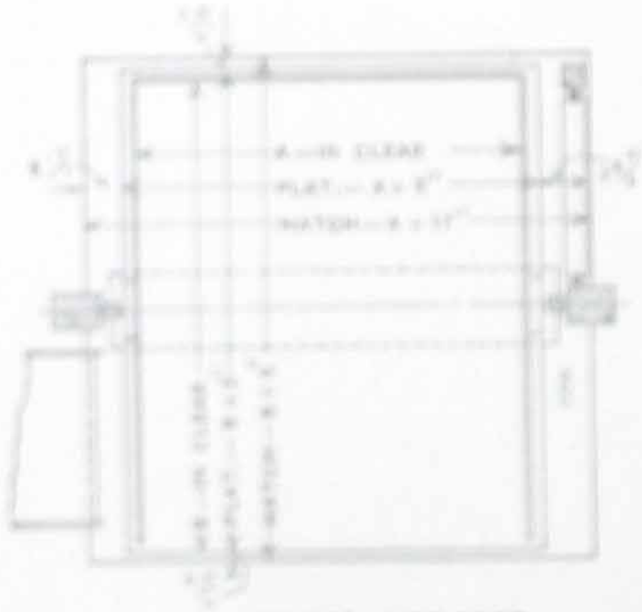


WOOD GUIDES. SIDE POST.
MACHINE AND COUNTERWEIGHT
AT SIDE.

FOR SINGLE BELT CEILING MACHINE
OR DIRECT ELECTRIC "

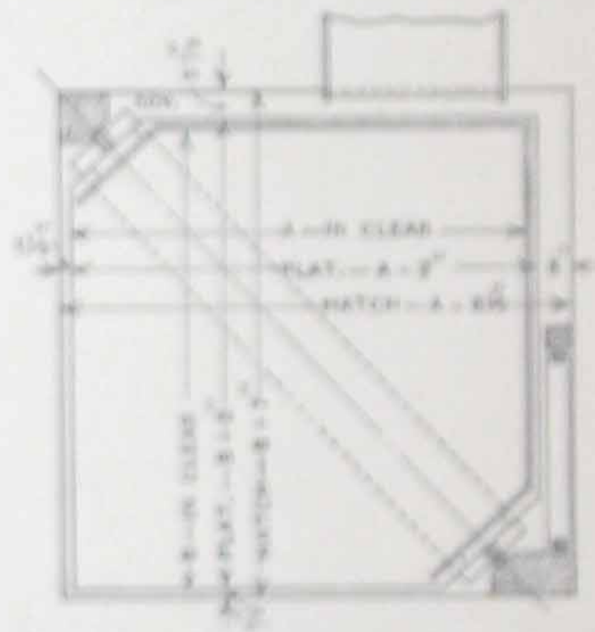


WOOD GUIDES. CORNER POST.
MACHINE AT BACK OR DIRECT ELECTRIC.
COUNTERWEIGHT AT SIDE.



WOOD GUIDES. SIDE POST.
MACHINE AND COUNTERWEIGHT
AT SIDE.

FOR DOUBLE BELT CEILING MACHINE



WOOD GUIDES. CORNER POST.
MACHINE AT BACK.
COUNTERWEIGHT AT SIDE.

Scale $\frac{1}{4}" = 1'$

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API INTERNATIONAL

CCA

OTIS
ELEVATORS